Long Island REDC

Phase II Regional Sector-Based Strategies

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Executive summary

Recent investments demonstrate the State of New York's commitment to growing a strong and durable workforce for the future economy. Via the newly created Office of Strategic Workforce Development (OSWD), Empire State Development (ESD) and the Regional Economic Development Councils (REDCs) have identified the industry sectors that have the most potential for growing inclusive, robust economies in each region and throughout the state. Accomplishing this goal will require continued investments and coordination at the state level, renewed collaboration between stakeholders in each region, and comprehensive assessments of existing and potential capacities in the workforce development ecosystem. A specific focus of this effort is the necessary strategies and partnerships that can have the most impact on increasing labor force participation, especially among underserved populations across the state.

Over the course of the project, the EY team, in partnership with Stragility, LLC. (a NYS Certified WBE), worked closely with the Long Island REDC to establish sector priorities and develop strategic considerations that support and augment existing strategies and have the most promising impact on economic growth and opportunity for the local workforce and industry. During the research and stakeholder engagement process, our team discovered several common themes across the regions and state. These themes formed the basis for strategy development and are expanded on further in the report. They include:

- Strategies for driving long-term competitiveness and sustainable talent pipelines in the targeted sectors require intensive collaboration at the state, regional and local levels. Some effective coalitions exist, but enhanced efforts in information sharing and the development and alignment of regional strategies can prevent duplication of efforts when building effective workforce strategies.

- Significant work remains in raising awareness of careers in the tradable sectors. Articulating the wage potential and funded training and supports is important in reaching the most vulnerable populations and will serve to counter misperceptions about technical careers.

- Labor force participation has negatively impacted incumbent labor pools, and training initiatives alone are not the solution. Special considerations are important to reach the underserved, and to compel those not seeking employment today to return to the workforce.

- There is inconsistency in the supply of educational programming, K-12 to industry pathways, and job placement consortiums that create opportunity and contribute to successful talent acquisition and retention in the targeted sectors.

- Employer engagement in the development of new training, identification of essential skills, and adoption of direct placement programs is essential in the workforce development pipeline.

Aligning the many assets and partners on Long Island is key to solving the workforce challenges of today and the future. As the champion of this strategy, the Long Island REDC is well-positioned to convene regional partners and provide connections to valuable statewide resources. There is also an opportunity for the REDC in leveraging the momentum and investments from the region's offshore wind initiatives to build a stronger workforce ecosystem to support all of Long Island. Uniting the region in action is no small task, but it is integral to the successful launch of potential opportunities outlined in this strategy report.

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Disclaimer

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Introduction

Project overview

In the spring of 2022, New York Governor Kathy Hochul launched the Office of Strategic Workforce Development (OSWD) with a $350 million investment to align regional workforce development efforts with the needs of employers in New York, particularly those in growing sectors. Under the direction of the Empire State Development (ESD), OSWD is charged with coordinating with agency partners, employers, institutions of higher education, and regional stakeholders to achieve the following goals:

- Expanding access to training and placement support for underserved communities that have traditionally faced barriers to employment
- Ensuring New York's workforce is equipped with skills to meet the needs of businesses in high-growth, tradable sectors across the state
- Creating pathways for unemployed and underemployed New Yorkers to access good jobs that provide economic security and opportunities for career growth
- Sustaining talent pipelines for essential industries experiencing growing needs and high attrition rates, such as health care, education, and civil service

In 2021, ESD charged New York State's (NYS) 10 Regional Economic Development Councils (REDCs) with developing a Regional Workforce Inventory (Inventory or Phase I) that identified the following:

- Each REDC's priority tradable sectors
- The most in-demand skill sets needed by employers
- Populations for whom workforce training is most needed
- Wraparound services needed to lower workforce entry barriers

In addition to benchmarking each region's post-pandemic workforce needs, Phase I laid the groundwork for the potential allocation of multi-year funding, which includes $150 million in grant programs designed to support employer-driven, high-skilled workforce training programs.

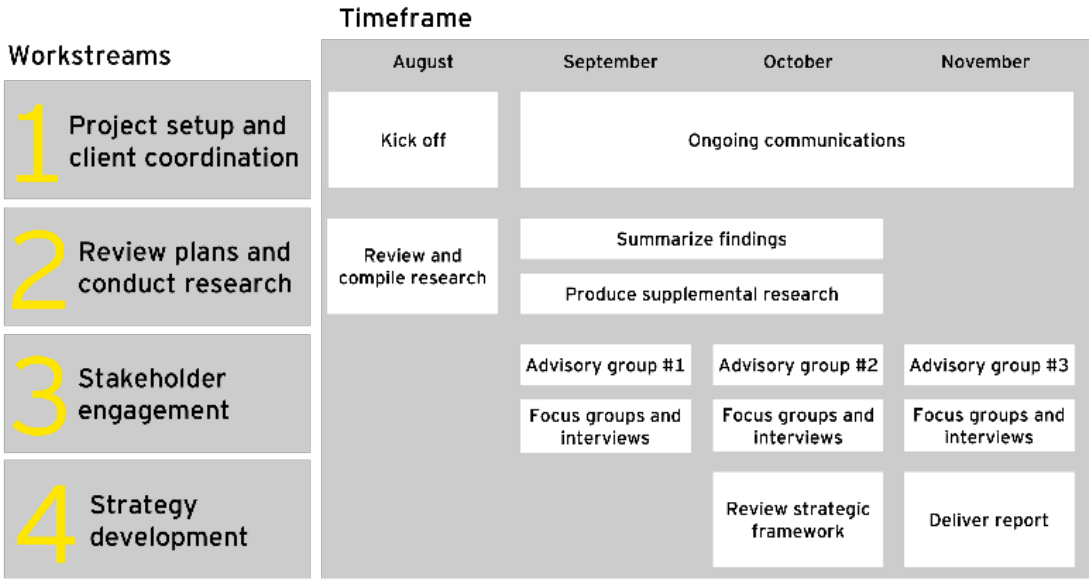
Phase II objective

In August 2022, ESD retained Ernst & Young LLP (EY) to aid the Long Island Regional Economic Development Council (LIREDC) with validating and building upon the work completed in Phase I and aligning LIREDC's work with ESD's goals, objectives, and statewide strategy for economic development.

In Phase II, EY, in partnership with Stragility, LLC. (a NYS Certified WBE), was tasked with developing sector-specific workforce strategies that provide a roadmap for how to address the workforce issues identified for LIREDC's targeted tradable sectors. More broadly, the strategies seek to promote the overall economic health of the region, increase the resiliency and size of the labor market for employers, and serve the underserved and underrepresented populations.

Process

The process for Phase II included four workstreams occurring over three months. Those workstreams are illustrated below.



Over the course of the engagement, EY maintained ongoing communication with LIREDC and ESD to provide status updates, plan meetings, and track progress.

Industry selection

When considering the industry sectors to prioritize in a workforce development strategy, EY supported LIREDC in evaluating how Long Island's inventory of established tradable sectors performs against the following criteria:

- Alignment with ESD's statewide target industry sectors
- Best use of Long Island's current and planned future assets and tools
- Support for Long Island's goals and values
- Regional labor force and employer needs
- Minimal barriers to entry for unemployed, underemployed, and underserved
- Projected job growth (positions and wages) in the sector

Of the four tradable sectors identified in Phase I, LIREDC and its advisory committee agreed to focus their regional strategies in support of the Advanced Manufacturing and Life Science & Biotech industry sectors. The North American Industrial Classification System (NAICS) codes associated with these sectors were defined by the New York Department of Labor and provided to the EY team by ESD. These are provided in the data appendix.

The targeted industries of Advanced Manufacturing and Life Science & Biotech operate regional employment pipelines that have the potential to bridge high-wage occupations with current and future job seekers that may be unemployed, underemployed, and underserved. The diverse basket of goods manufactured and assembled on Long Island is consumed on a global scale, which bodes well for the industry sectors' resilience.

Background review

To begin the project, EY conducted a background review of documents provided by LIREDC to better understand the workforce and target sectors of the Long Island region, as well as recent economic development priorities and achievements for the region and the REDC.

The following is a non-exhaustive list of materials provided to and reviewed by EY:

- Long Island Progress Report, Phase I (2022)
- Long Island Progress 2021 Report (2021)
- Significant Industries, Department of Labor (2021)
- Workforce Development Institute: Long Island Manufacturing Snapshot (2019)
- Driving Long Island's Innovation Economy: The Pharmaceutical/Nutraceutical Growth Factor (2019)
- JLP+D Long Island Workforce Report (2020)
- Long Island Business Workforce Survey Results (2022)
- County-Level Jobs Trends, Department of Labor (2022)
- Labor Market Briefing, Department of Labor (2022)
- New York Manufacturing Extension Partnership Report (2021)
- REDC Phase II Guidance, New York State ESD/OSWD (2022)

Supplemental data analysis

While the Phase I: Inventory provides a sound foundation for direction, further quantitative research was needed to validate those findings and the findings from the surveys conducted in partnership between New York State and the Business Council of New York State.

The following were suggested for supplemental research and are provided as an appendix to the final report:

- Regional workforce conditions
- Industry analysis on the two target sectors: Advanced Manufacturing and Life Science & Biotech
- Occupational analysis of the two target sectors
- Educational programming that supports overall workforce development and the programming specific to the two target sectors

Stakeholder engagement

To supplement the analysis and findings from Phase I and Phase II, EY collaborated with LIREDC and its advisory committee to identify employers, industry associations, training providers, community-based organizations, wraparound service providers, educational institutions, labor unions and other relevant stakeholders across the Advanced Manufacturing and Life Science & Biotech industry sectors. These groups were invited to participate in focus groups and interviews during October.

Focus group and interview list

Industry focus groups	Ecosystem partners focus groups	Interviews
Life Science & Biomedical Research and Development	Government partners	Brentwood Union Free School District
Industrial Manufacturing	Non-profit/social services partners (2)	Suffolk County Department of Labor
Electrical Manufacturing		Suffolk County Community College (SCCC)
Life Science & Biomedical Manufacturing		Eastern Suffolk Boards of Cooperative Educational Services (BOCES)
		Nassau BOCES

Advanced Manufacturing

A workforce development strategy for the Advanced Manufacturing industry on Long Island

Advanced Manufacturing
Research findings

Industry overview

The Long Island REDC selected Advanced Manufacturing as one of the two industries to receive a workforce strategy based on its potential for unemployed, underemployed, and underserved jobseekers, as well as its ability to promote resiliency in the regional economy.

The Advanced Manufacturing industry is vital to the survival and prosperity of both Long Island and the nation. The industry employs nearly 35,000 people and represents a diversity of companies from the aerospace & defense sector to pharmaceuticals. While employment numbers have declined in recent years, the sector has increased in overall diversity and is expected to continue to do so with recent investments in the offshore wind industry. Today, more than 1,000 Advanced Manufacturing firms are present on Long Island.

Workforce challenges are plaguing the Advanced Manufacturing industry, both on Long Island and across the nation. From an availability standpoint, the region is currently facing record low unemployment rates. Several employers shared they have even turned down business due to lack of workers to fill additional shifts. The workforce is also aging which could create greater challenges down the road. Addressing the current and future talent needs will be integral to the long-term success of Advanced Manufacturing in the region and will require a diverse array of awareness, outreach, training and support services for both the workforce and industry.

Advanced Manufacturing presents a valuable opportunity for potential jobseekers, including those that are currently disengaged from the workforce or underemployed, like the more than 25% of households that are Asset-Limited, Income-Constrained and Employed (ALICE).[1] The industry has low barriers to entry, plenty of growth opportunities and higher than average wages. For all these reasons and more, Advanced Manufacturing continues to be a key tradable sector for Long Island.

[1] *Source: UnitedWayALICE.org Research Center, New York-Household Budgets 2018, United Way of Northern New Jersey Corporation*

Workforce analysis

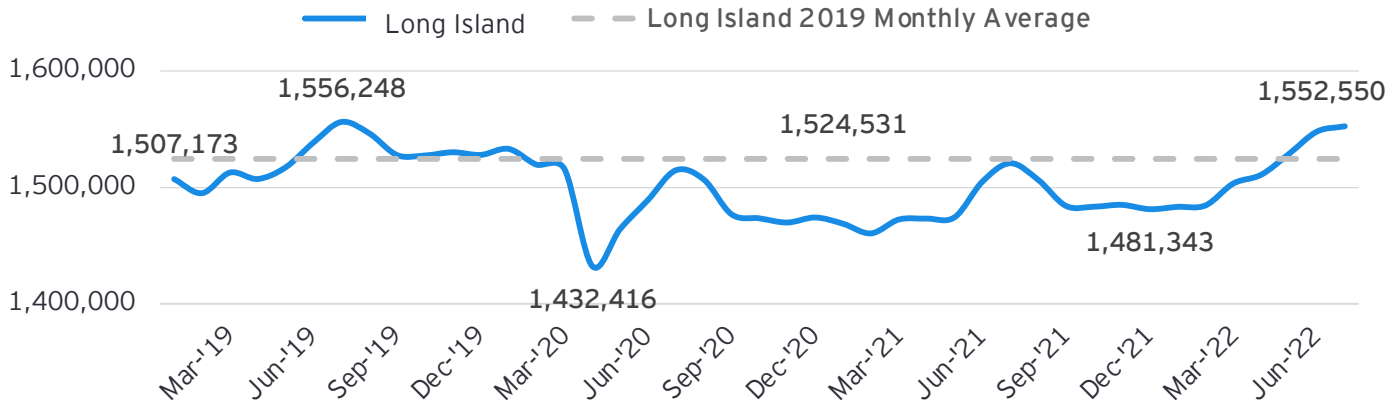
Population trends by year, age, and race/ethnicity provide insights on the region's ability to supply the labor needed to support Long Island's economy.

Unemployment and labor force participation

- Unemployment rates have steadily declined since the height of the pandemic and now hover around 3%, which is less than the state average.
- Unemployment rates decline with higher levels of education, yet less-educated workers in the region have lower unemployment than the state average.
- The labor force (those working or looking for work) on Long Island is larger than pre-pandemic levels, and the labor participation rate is higher on Long Island than the state average; still, employment (those working) in the region has yet to fully rebound to pre-pandemic levels.
- Labor participation rates on Long Island are highest for people in their prime working age (25 to 54 years old) and with higher levels of education. Still, older residents have higher participation rates than the state average.
- Labor participation rates for minorities on Long Island are much higher than the state average, while white participation is on par with the state.

More people are either working or looking for work on Long Island than before the pandemic.

Labor force size by month, Jan. 2019 – July 2022



Source:
US Bureau of Labor Statistics

Population trends

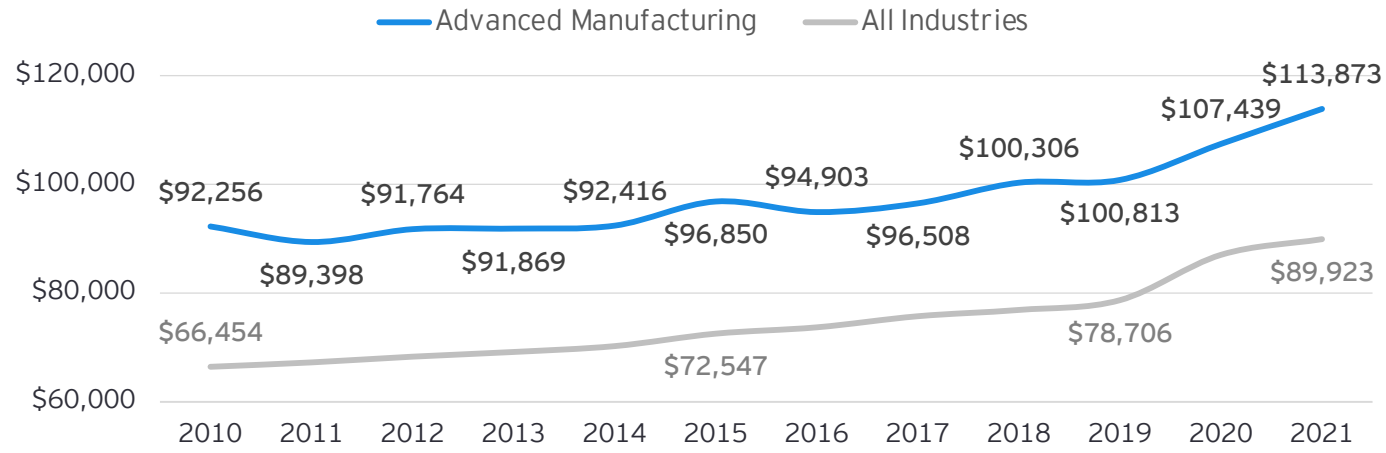
- The population on Long Island is predominantly white (62%) but is increasing in diversity. While the white population declined over the last five years, all other races and ethnicities grew, including a 19% growth in the Asian population and 9% growth in the Hispanic population.
- Long Island's population slowly declined last decade but rebounded in 2021 after the pandemic. Nassau County experienced nominal population growth over the last 10 years, while Suffolk County experienced a small decline.
- Long Island has an aging workforce. Its share of people 45 years or older is slightly higher than the statewide average (46% versus 44%), and its share of young professionals (25 to 44 years old) is lower (24% versus 27%).
- Long Island's retiree population (65 years old or older) has grown the fastest in the past five years, followed by those 25 to 44 years old. All other population groups have declined.

Industry analysis

Examining the overall trends facing the Advanced Manufacturing industry sheds light on the region's competitive advantage to recruit, expand, and retain high-impact businesses that invest in the tax base. Equally important, these enterprises present an opportunity to offer high-quality, in-demand jobs for Long Island's unemployed, underserved, and underrepresented populations.

- Nearly 35,000 Advanced Manufacturing jobs are on Long Island . Pharmaceutical, Instruments, and Medical Equipment comprise about half of jobs. Aerospace and Machinery are top sectors as well.
- Jobs in Advanced Manufacturing on Long Island saw a decline of 16% between 2012 and 2022. Despite the decline, over 1,000 Advanced Manufacturing businesses are found on Long Island today.
- The fastest-growing Advanced Manufacturing subsector on Long Island is Chemical Manufacturing, which is also the biggest concentration (highest per capita jobs). Most other subsectors are declining.
- Growth opportunities exist in Advanced Manufacturing. Earnings on Long Island 's Advanced Manufacturing sector are high. In 2021, the average annual earnings amounted to $113,873 compared with $89,923 across all industries in the region.
- Over half of Long Island's Advanced Manufacturing workforce is 45 years or older, and the region's early career talent pipeline (19 to 24 years old) is underrepresented in Advanced Manufacturing. These trends suggest a growing talent shortage at various levels of experience.
- Females are underrepresented in the Advanced Manufacturing workforce. Male workers on Long Island account for nearly two-thirds of Advanced Manufacturing workers but slightly less than half of workers in all industries.

Average annual earnings, 2010 – 2021



Source: Lightcast

Earnings in Advanced Manufacturing are significantly higher than the regional average

Occupational analysis

Talent development requires coordination among employers, educators, and training facilities. Maintaining a system-wide understanding of staffing patterns, typical entry-level education, and potential earnings helps to preserve a talent pipeline that's responsive to the needs of employers and job seekers.

- Advanced Manufacturing offers low barriers to entry, as over half of all jobs only require a high school education. The median hourly earnings for the top 25 of these entry level positions is $23.06.
- A large number of Long Island workers in Advanced Manufacturing are in electrical assembly, packaging machine operators, miscellaneous assembly, and clerks. Bachelor's level demand is concentrated in operations managers, software developers, and engineers.
- For those with a high school diploma or equivalent, most Long Island jobs in Advanced Manufacturing are in assembly, packaging, clerks, inspectors, equipment operators, and maintenance.
- For positions requiring some college or an associate's degree, most Long Island jobs in Advanced Manufacturing are for clerks, computer support, technicians, and drivers.
- For positions requiring a bachelor's degree, most Long Island jobs in Advanced Manufacturing are for managers, software developers, buyers, industrial engineers, accountants, and analysts.

Educational programming observations

A region's ability to produce talent across the entire labor spectrum is closely linked to its ability to sustain economic growth. Analyzing the output from Long Island's educational programming provides insights on labor shortages, misalignment with employer needs, and clarity into workforce development investments.

General

- The population on Long Island is well-educated, with nearly 42% of adults (25 years old or older) having a bachelor's or higher (compared with 37% for the state). The share of adults with that level of educational attainment has increased over time.
- More students on Long Island are part-time than seen across the state (5% more are part-time locally). Conversely, the region has a smaller share of full-time students (48.8%) and graduate students (18.6%) enrolled in higher education institutions compared with the state (52.5% and 19.5%, respectively).
- Regional degree production is concentrated at the baccalaureate and graduate level: Over 70% of all accredited certificates and degrees produced on Long Island are at the bachelor's level or higher.
- Health programs on Long Island produce the highest number of graduates by far, with all levels of education well-represented from certificates to doctorates. Business programs produce the next highest number of graduates, followed by Liberal Arts and Education. Computer/IT and Engineering reflect a relatively small share of all graduates.
- Accredited certificate production is highest for one-year programs (42.3%), but shorter-term programs account for a majority of all certificates produced (54%).
- Registered apprenticeship programs on Long Island have expanded to their highest levels since 2016, growing by more than 88%. Program growth between 2020 and 2021 is an impressive 47% year-over-year.
- New apprenticeships are concentrated in the skilled trades: Electrician programs receive the most new apprentices each year in the state, followed by Construction Laborers, and Sheet Metal Workers. Triple-digit increases in new apprentices have occurred across six occupations.

Educational programming observations

Industry-specific

- Advanced Manufacturing firms require diverse occupations and skill levels to fill jobs in their facilities. Our gap analysis shows that Long Island does not produce (accredited) Certificate-level graduates in Advanced Manufacturing and overproduces Bachelor's graduates, who are likely to leave the region or commute out for jobs.
- Certificate-level positions are significantly underserved by local accredited education programs, which may suggest manufacturers are reliant on for-profit educators or on-the-job training. At the Associate's level, Chemical Technicians are not produced in the region, but Electrical/Electronic Technicians have large numbers of graduates.
- At the Bachelor's level, programs in Accounting and Chemistry underproduce graduates to meet job demand, and no programs are available in Operations Research. Engineering and IT programs appear to be either in-balance with local job demand or over-supplied. Long Island's unique position as a home for commuters may suggest that graduates may also plan to commute or relocate out for jobs. Manufacturers may also rely on attracting new undergraduate hires to relocate or commute in.

Supply-Demand Gap Conditions
Advanced Manufacturing, Long Island

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US
	Electrical & Electronics Repairers	Certificate	194	0	0%	0%
	General Machinist	Certificate	174	0	0%	0%
	Industrial Production Technicians	Certificate	206	0	0%	0%
	Industrial Machinery Maintenance	Certificate	181	0	0%	0%
	Precision Equipment Repair	Certificate	1,418	0	0%	0%
	Welders	Certificate	141	0	0%	0%
	Chemical Technicians	Associate's	42	0	0%	0%
	Electrical / Electronics Technicians & Di	Associate's	72	193	268%	991%
	Industrial Engineering Technicians	Associate's	33	2	6%	6%
	Accountants & Tax Examiners	Bachelor's	1,294	473	37%	75%
	Operations Research Analysts	Bachelor's	45	0	0%	0%
	Chemists	Bachelor's	87	129	149%	66%
	Electrical and Electronics Engineers	Bachelor's	108	288	268%	213%
	Engineering Managers	Bachelor's	59	100	169%	325%
	Industrial Engineers	Bachelor's	81	67	83%	113%
	Mechanical Engineers	Bachelor's	78	451	580%	340%
	Computer Systems & Information Secui	Bachelor's	477	491	103%	114%
	Supply Chain Managers & Analysts	Bachelor's	77	2	3%	7%

Lg Shortage | Shortage | In-Balance | Over-Supply | Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

Ecosystem observations

An initial framework was developed to help assess the strengths, challenges, and opportunities across Long Island's regional workforce development ecosystem. This framework focused on the areas of 1) industry-informed training, 2) awareness of opportunities, and 3) wraparound services and support. The following illustration outlines the types of work within each of those focus areas.

Industry-informed training

Strengthening relationships between employers and the talent pipeline is a central component of OSWD's approach to workforce development. Alignment of industry needs with career readiness, on-the-job training, and reskilling activities may expand the career pathways and pipeline for all segments of the labor force.

- The region is home to several training centers, programs, and institutions that offer manufacturing-related degree and non-degree certifications, including the Suffolk County Community College Advanced Manufacturing Training Center, the Center for Workforce Development at Nassau Community College, Offshore Wind Training Institute, Renewable Energy and Sustainability Center of Farmingdale, and the three local BOCES, to name a few.
- Select manufacturers are engaged in developing industry-informed training with local education institutions and workforce partners. In other cases, they have limited resources and know-how for engaging with educators.
- Overall, employer engagement in the development of region-wide manufacturing curriculum could be enhanced.

Ecosystem observations

Awareness of opportunities

Innovation within the Advanced Manufacturing industry has advanced the means of production to include a wide range of career opportunities, yet the perception of the old ways of manufacturing persists. Dedicated and coordinated campaigns, shared resources, regional initiatives, and increased employer engagement may increase awareness and participation within the industry.

- While training programs and support organizations exist within the region, a platform for identifying and exploring regional career and training opportunities in Advanced Manufacturing does not currently exist and could inhibit awareness and interest in the industry.
- The geography of Long Island presents challenges for accessibility. According to stakeholders and a review of background research, those challenges are further exacerbated by the number of separate entities in the workforce ecosystem that tend to work in silos. For example, Long Island is served by more than 120 school districts. The sheer number creates obstacles for collaboration, communications, deploying resources, and scaling of programs.
- Government and private/non-profit organizations (e.g., Manufacturing & Technology Resource Consortium (MTRC), Departments of Labor in Nassau and Suffolk County, and the three Local Workforce Development Boards) are providing workforce development funding and assistance, especially in select sectors and for target populations, but alignment of programs could be improved, programs for targeted industries enhanced, and levels of bureaucracy associated with some programs reduced.
- The region could benefit from a well-resourced manufacturing association. While consortiums (e.g., Ignite Long Island and ADDAPT) provide advocacy and services on behalf of various subsectors, they have limited and inconsistent funding and staffing, and are often dependent on grants.
- Events like Manufacturing Day and career open houses seek to raise awareness for opportunities in the sector, but efforts could be more frequent, coordinated, and tailored to the job seeker. In general, job seekers may not be fully aware and informed of the career opportunities offered by Advanced Manufacturing.

Wraparound services and support

Socioeconomic barriers may hamper target populations' ability to complete a career-advancement program, obtain or retain a job in Advanced Manufacturing, or participate in the labor force. Addressing these impediments through services and programs may unlock opportunities for hidden talent in the Advanced Manufacturing industry.

- Limited availability of childcare spots for new children, high cost for parents, and low wages for caretakers make it difficult for some residents with children to enter the labor force.
- Long Island is a vehicle-reliant region, as 73% of commuters use vehicles to get to work. Public transportation options are limited, especially for commutes that run north to south on the island.
- Potential job seekers who have been out of the workforce sometimes require coaching to prepare for a job and mentoring once employed.
- Housing availability and affordability is an issue on Long Island that limits population growth, and therefore available workforce. Many stakeholders expressed a need for more housing near employment centers.
- Limited availability of wraparound support services often inhibits untapped incumbent talent from workforce and/or training entry, and both potential job seekers and employers struggle to navigate available resources.
- There is a high concentration of small to medium manufacturers in the region that may not have the resources or capacity to pursue programs to upskill their labor force or onboard talent from non-traditional sources.

Advanced Manufacturing Strategy framework

Industry overview

With the insights gathered through the background review and stakeholder engagement process, the following strategic framework was developed as the foundation of a sector-based workforce development plan.

The strategic framework comprises four goals, each with considerations that clarify the direction Advanced Manufacturing leaders could pursue to achieve the goal. Within each goal, an assessment of activities identifies areas that are primed for change or investment. Opportunities are presented as potential solutions, which may be taken to address stated challenges and realize the goal.

Goals

1. Enhanced regional coordination in Advanced Manufacturing.
2. Expanded training and wraparound services for underserved populations.
3. Excitement for careers in Advanced Manufacturing.
4. Establish pathways to direct employment and growth opportunities.

Target populations

- Asset-Limited, Income Constrained, Employed (ALICE)
- Individuals outside of the workforce
- Talent outside of college bound students
- Incumbent workforce
- Workers transitioning from other industries, especially women

Goal 1: Enhanced regional coordination in Advanced Manufacturing

Investments in workforce and economic development have been increasing over the last decade, and exponentially so with the rollout of federal relief programs like the American Rescue Plan.[1] This increase in funding illustrates the level of importance the nation and individual states put on solving the current talent shortage. However, as the attention and funding streams for workforce development increased, more organizations entered into the broader workforce ecosystem. Unfortunately, coordination and alignment of these organizations have not kept pace. As one stakeholder stated, "no one is in their lane anymore." While additional programming and funding are positive, it has also created confusion in the market for employers, potential job seekers, and everyone in between as to whom to contact for help. The time has come to take pause and inventory what programs exist, what funding is available, and how resources could be used more effectively.

This is also a unique time for employers. Significant industry transformation is underway; five generations are in the workforce; there are increasingly diverse populations; and many are still recovering from the pandemic. Attracting, retaining, developing, and managing talent in this environment can be challenging, to say the least. Leaders in Advanced Manufacturing need a resource for understanding these various dynamics and what tools and leading practices exist to create a more competitive work environment and how their engagement can contribute to the building of a stronger workforce pipeline. Enhanced industry support and regional coordination are two complementary solutions for engaging and supporting employers in accomplishing these goals within Advanced Manufacturing.

Recent public and private sector investments in expanding Long Island's offshore wind sector will likely translate to increased resources and attention in the region's broader workforce ecosystem. While initiatives such as Farmingdale State College and Stony Brook University's Offshore Wind Training Institute serves only a segment of the region's Advanced Manufacturing industry, the infrastructure it will need to achieve its goals could be spread industry and region-wide. Regional collaboration and coordination are encouraged.

Here are some considerations on regional and industry coordination:

- The talent challenges facing employers on Long Island will likely not be solved by one entity alone. Solutions will require coordination and contributions from a host of partners involved in the entire workforce ecosystem — employers, educators, community-based organizations/non-profits and government organizations, to name a few.
- Inventorying and assessing the programs, targets, and funding sources of all partners in the workforce ecosystem is a critical first step in identifying gaps and opportunities and in aligning efforts moving forward. A better understanding of the available resources and their limitations will also support more effective allocation of these funds.
- To better understand the talent ecosystem, employers will need accessible, real-time information on available training programs and resources, plus leading practices on talent management, leadership, and new industry dynamics.
- Given the complexities of navigating the ever-changing ecosystem, some economic development entities have employed workforce development coordinators to serve as concierges to employers' talent needs. This is in addition to the standard business retention and expansion support (BRE).
- A single entity, like a manufacturers association, is often charged with convening employers, educating them on relevant industry topics, activating shared initiatives, and advocating on their behalf. To be effective, these associations require adequate funding and staff.

[1] Source: *Jacob Stenstrom, State Investment in Workforce Development on the Rise,* The Council for Community and Community Research, *October 2019*

Assessment of regional coordination and industry support on Long Island

Regional coordination and industry support were common discussion points shared in our stakeholder conversations. Some key observations include:

- While the geography of Long Island presents challenges for accessibility, those challenges are further exacerbated by the number of separate entities in the workforce ecosystem that tend to work in silos. For example, Long Island is served by more than 120 school districts. The sheer number creates obstacles for collaboration, communications, deploying resources, and scaling of programs.
- The region could benefit from a well-resourced manufacturing association. While consortiums (e.g., Ignite Long Island and ADDAPT) provide advocacy and services on behalf of various subsectors, they have limited, consistent funding and staffing, and are often dependent on grants. As such, many manufacturers have limited awareness and available resources to dedicate to engaging with educators.
- LIREDC can be a champion and convener of this strategy but would need additional resources for activation. The region could benefit from a single unified entity for convening ecosystem partners and activating a shared plan for workforce development. In other regions, this is a regional economic development organization with strong employer engagement, but such an organization does not exist on Long Island.

Possible opportunities

The following are opportunities that the Long Island could explore to enhance regional coordination and support of Advanced Manufacturing:

- **Assess the long-term need for a regional economic development organization.**

  A regional economic development organization could provide the coordination necessary to activate elements of this goal area and support other industry strategies, but a feasibility study would need to occur first to assess the needs and interest for supporting such an organization. If established the regional organization could take on the role of establishing the workforce consortium, developing the asset map and activating the workforce coordinators. They could also serve as the convener for this and other targeted industries.

  Potential partners: Major employers, elected officials, community leaders, local chambers, economic development organizations, IDAs

- **Support a fully resourced, employer-led manufacturers association with a complete suite of services.**

  Industry associations provide a platform for employers of all sizes to convene for discussions on leadership, talent, current skills needs, and changing industry dynamics. It can also be a platform for sharing leading practices, activating shared initiatives, and enhancing overall collaboration. Such an organization could also take ownership of much of this strategy.

  Sample initiatives it could tackle:

  - Identification and awareness for engagement opportunities (i.e., industry ambassador programs, networks/initiatives for diverse populations, shared apprenticeships)
  - Ongoing skill needs/assessment for the industry
  - Education and trainings for how to be an "employer of choice" (e.g., company culture, cultural understanding, flexible work arrangements)

  Potential partners: Employers, IDAs, local chambers and economic development organizations, local and statewide industry associations

Ignite LI is a member of The Manufacturers Alliance, a coalition of eight regional manufacturing associations. The Alliance supports companies with recruiting, upskilling, and retaining talent through the NYS Registered Apprenticeship program. Ignite LI could continue to draw support from the Alliance to scale potential solutions.

- **Establish a workforce consortium with representatives from all parts of the workforce development pipeline.**

  A workforce consortium allows for all entities engaged in the workforce pipeline to convene for awareness and assessment of current challenges and opportunities, supporting all sectors. This could include non-profits and social services organizations providing wraparound services and support for target populations, training centers and educational institutions, and government-supported workforce agencies, to name a few.

  Potential partners: REDC, government-affiliated workforce development agencies, education partners and training institutions at all levels, industry employers and associations, labor unions, IDAs and economic development organizations engaged in workforce development, non-profits and social services

- **Develop an inventory and assessment of existing workforce programs, target populations, and funding sources.**

  A high-priority task for the consortium would be to develop a comprehensive inventory that could be used to create an asset map of resources for potential job seekers and employers but could also be the foundation for an assessment that maps funding sources, program targets, and programs to identify gaps and challenges and ways to utilize resources most effectively.

  Potential partners: Government-affiliated workforce agencies, social services organizations and non-profits, and education and training providers

- **Create workforce coordinator roles to support Advanced Manufacturing.**

  To better understand the talent ecosystem, employers will need accessible, real-time information on available training programs and resources and a concierge for navigating them. These coordinators can serve one or many industry sectors. A structured training program for these coordinators would also be beneficial. Additional roles for the coordinator are outlined in goal four.

  Potential partners: NY ESD, REDC, IDAs, local chambers and economic development organizations, industry associations

- **Develop coordination and sharing agreements across partners.**

  A priority task for the workforce consortium and workforce coordinators would be to create a shared agreement for how outreach is conducted, and employer needs assessed and addressed. An information-sharing agreement and/or system could also reduce the number of duplicative meetings to one company.

  Potential partners: all ecosystem partners

Manufacturing Association of Central New York (MACNY) and CenterStateCEO
These two organizations in Central New York illustrate the potential for partnerships in support of the manufacturing industry. At the start of the pandemic, CenterState CEO worked with MACNY to advocate for best practice workplace safety standards in manufacturing. They have also partnered together on federal grant opportunities. MACNY and CenterState CEO are primarily funded by employers.

Goal 2: Excitement for careers in Advanced Manufacturing

Limited awareness and misperceptions surrounding career opportunities was a resounding theme across Long Island. This issue was expressed across industry sectors and by employers large and small, but especially in Advanced Manufacturing. It was also noted as a shared concern across all four regions served by EY during this project and is recognized as a nationwide issue as well. Its prominence across regions, sectors, and employers suggests that it not only be a top priority for Long Island Advanced Manufacturing but for the state as a whole.

The fairly static population growth on Long Island coupled with declines in the future talent pipeline further stress the importance of this goal. As such, the awareness of the career and growth opportunities within Advanced Manufacturing is primarily focused on the K-12 talent pipeline but extends further to those seeking to re-enter the workforce or considering a career change

Here are some considerations when focused on the K-12 pipeline:

- Awareness and exposure can start at an early age with the level of employer engagement increasing over time as the students reach junior high school.
- The misperception of certain career opportunities by school administrators, teachers, and career counselors could impact students' awareness and access to valuable training and opportunities.
- Parents should not be overlooked in awareness efforts, as they often play an important role in guiding their child's future career and educational decisions.

For all audiences:

- Content should be exciting to interest students and potential job seekers in engaging in further exploration.
- Misperceptions will need to be addressed head on, both in aspects of the job and work environment and a person's ability to do the job, due to skills, resources, and networks.
- Peer experience is viewed as an effective method for helping both students and potential job seekers see themselves in an opportunity. These ambassador-type programs have been popular for the last several decades and with social media, have the potential for an even greater reach.
- Career opportunities can be a driver for talent attraction and retention efforts, but the promotion of the region/communities and its livability are also important. Many communities package this information in a live, work, and play framework.

My Colorado Journey
My Colorado Journey is an interactive and consolidated platform that connects potential job seekers to individualized career, training, and educational resources. By centralizing educational and training programs, users spend less time searching for in-demand career options and pathways. Several state agencies provide coordinated support for the tool.

Assessment of career awareness on Long Island for Advanced Manufacturing

Awareness was one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from that research were as follows:

- Employers have an important role to play in this and every goal. Their presence and engagement in the community, participation in career awareness events and support of employees engaging in ambassador programs are integral in creating more excitement for local careers opportunities.
- The schools provide a direct gateway to accessing students and their parents. The number of school districts and schools on Long Island creates an additional barrier to employers trying to engage students as each district and school represents additional time to access and engage with students. State and regional programming could alleviate some of these accessibility challenges.
- Career awareness initiatives and resources available by school district vary by community. A shared curriculum and coordinated plan for career awareness and employer engagement could benefit schools with less resources. In some instances, resources, equipment, and initiatives could be shared across numerous districts through the local BOCES or a regional educational foundation.
- Regional assets and events such as Manufacturing Day, First® Long Island, the Cradle of Aviation Museum and Education Center and the Long Island Stem Hub provide awareness and exposure opportunities for students, teachers, and parents across the region. Enhancing these programs and tying them to a broader employer-engaged effort will be beneficial.
- Reaching and engaging the target populations will likely necessitate a well-resourced multi-media campaign and interactive platform for promoting careers and educational opportunities in the target sectors. An initiative of this size could be led at the state level with ties to regional resources and opportunities.
- In addition to any statewide resources, there are initiatives sponsored by national manufacturing associations for promoting careers in their sector. These often include networks, events and competitions, sample activities and curriculum suggestions, and toolkits for promoting the sector. The region should leverage these publicly available resources when possible.

Potential opportunities

The following are opportunities Long Island could explore to increase awareness and excitement for career opportunities in Advanced Manufacturing.

- **Develop statewide multimedia campaign in select targeted sectors**

  These campaigns could include testimonials from peers, videos showcasing companies, and occupations and virtual reality experiences, to name a few. Content should be optimized for various media channels and sharing platforms.

  Ideally, this content could be developed at the state level, focusing on the economic mobility of identified industry sectors, followed by regional campaigns supporting specific industry sectors. The goal of a campaign would be to dispel myths, create momentum, and generate interest in manufacturing careers.

  Potential partners: NY ESD, New York Department of Labor (DOL), major industry associations, employers

South Carolina Future Makers
The South Carolina Manufacturers Alliance launched a public-private partnership to increase engagement between the state's manufacturing companies, technology communities and students from middle school to college, plus their parents. The initiative showcases the many paths and opportunities within manufacturing.

- **Launch an interactive website to showcase pathways, opportunities, and resources.**

  Any multimedia campaign should direct students, parents, and potential jobseekers to a landing page to further explore statewide or regional information on sector opportunities. Content should be well-designed and engaging, and target to specific audiences.

  Potential partners: NY ESD, NY DOL, major industry associations, employers

- **Develop a regional plan for employer engagement and career awareness for the K-12 pipeline .**

  This plan could outline how to coordinate, build upon, and align STEM education curriculum, STEM competitions, and career awareness and exposure events at early age, middle school, junior high and high school. Initiatives could occur in individual schools, at a broader community level or regionally. The audience would include administrators, career counselors, parents, and students. The plan could also include resource sharing. In some instances, new programs could be piloted in one district or school then scaled accordingly.

  Potential partners: NY DOL, NYS Education Department, NYS School Boards Association, school districts, BOCES, P-TECH, major industry associations, employers, learning centers/labs and educational non-profits

- **Expand dual enrollment, job shadowing, experiential learning, and pre-apprenticeship programming.**

  Promoting and scaling dual-enrollment programs in technical disciplines can create accelerated pathways for high school graduates who are not university bound. Coupled with job shadowing, experiential learning, and pre-apprenticeships, this approach could positively impact the industry's ability to attract more students. The challenge here is to connect these events back to actual career opportunities which could be included as part of the regional plan for employer engagement.

  Potential partners: BOCES, P-TECH, school districts, employers, industry partners

Pennsylvania Advanced Manufacturing Ambassadors
A new program will fund teams of industry ambassadors to visit select high schools, trade schools and community colleges and spark interest and awareness for manufacturing careers among students, teachers and administrators.

- **Establish local ambassador training programs.**

  Industry ambassadors can provide a deeper connection to the reality of a potential job opportunity. A regional program utilizing industry representatives as proponents of advanced manufacturing careers could train and deploy others with the faces, voices, and stories of local communities and target populations. Their stories are most powerful when told in person and could be featured in marketing materials. Long Island's population is growing in diversity and could benefit greatly from scaling existing programs that are focused on better understanding the needs of various cultures. In addition, reaching individuals through community and faith-based organizations with the message of attainable employment pathways can prove to be effective.

  Women and girls are an important target of these initiatives given how underrepresented they are in the manufacturing workforce.

  Potential partners: Industry associations and employers, local chambers, economic development organizations

Women in STEM initiative | All Girls Auto Know®
All Girls Auto Know® is an initiative of the Southern Automotive Women's Forum that brings together middle school girls and their teachers to experience the career opportunities available in STEM and automotive fields. Its goal is to increase the number of women pursuing STEM careers and degrees in the South.

Goal 3: Enhanced training and wraparound services for underserved populations

The size of Long Island's labor force has now exceeded pre-pandemic levels, and labor force participation rates are above statewide averages across nearly every race and ethnicity. Yet, employers on Long Island continue to face a shortage of applicants and qualified candidates. Equitable outcomes have also become a priority of state and federal administrations. Oftentimes, these traditionally underserved or marginalized groups have limited information or awareness of the available career pathways, and when upskilling or job opportunities are presented, they may require a package of services and support to forgo short-term gains (e.g., unemployment benefits; low-wage, non-career jobs) in exchange for long-term success.

Bringing more potential job seekers into careers in the targeted sectors, especially in historically marginalized communities, will necessitate an alignment of awareness, opportunity, wraparound supports, and placement. This alignment will require investment and coordination by all partners in the workforce ecosystem, including employers.

Here are some considerations for aligning these efforts:

- **Some populations require unique resources and supports** to address challenges related to education and skill level, language, culture, legal, or health issues. Some of these supports may need to occur prior to or in parallel to a short-term training program.
- Potential job seekers may respond more positively to **human-centered assistance that helps them navigate** the wraparound services offered in the region. Additionally, **wraparound services should be easy to navigate** and access, especially for unemployed, underemployed, and historically marginalized communities.
- It is common for wraparound services to be created and deployed independent of corresponding training programs. For the highest participation and awareness among vulnerable populations, consider **embedding wraparound services as a part of short-term training programs**, and the necessary collaboration to accomplish that should be a focus area. These services may include subsidized childcare, transportation stipends, free or reduced programming, and meal vouchers.
- **Employer engagement in all levels of training programs is essential to future placement**. This could include curriculum development, simulated workplace experiences and tours, and presentations by industry ambassadors with similar backgrounds. Direct-hire support from training programs is also considered a leading practice.
- The **need for wraparound services doesn't end at the completion of a skills training program or gainful employment**. Rather, employers' job placement practices may shift to meet job candidates where they may be in their career readiness. Years of additional support may be needed after the employee starts their job, as the barriers to career mobility are often generational.
- The "benefits cliff," or the offset in subsidized income associated with a small wage increase, creates a perverse disincentive for potential job seekers. **Utilizing tools like a benefits cliff calculator can help employers make better-informed decisions** when setting entry and mid-level wages.

Dashboard for Alabamians to Visualize Income Determinations (DAVID)
The Office of Alabama Governor Kay Ivey, in partnership with the Federal Reserve Bank of Atlanta, launched a first-in-nation career tool that includes a benefits cliff calculator within the state workforce development career path planner. DAVID helps individuals understand which career pathways will help them achieve self-sufficiency and overcome the potential loss of public assistance based on their income, region, occupation and family dynamics.

Assessment of wraparound services on Long Island

The need for supporting historically marginalized communities with integrated training and support services was highlighted in many conversations with stakeholders across the region.

Our main takeaways from those conversations were:

- There are a number of programs on Long Island that target disadvantaged and historically marginalized populations to include women in lower-income, majority-minority communities, veterans, at-risk youth, persons with disabilities, those in recovery from substance abuse and justice-involved individuals. Those programs are supported by the Empower Assist Care (EAC) Network, the Educational Opportunity Centers, BOCES and numerous programs by community-based organizations. While these programs offer valuable training and support, some of these programs stop short of industry-specific training and placement.
- The wraparound support services that most often inhibit traditionally marginalized and vulnerable populations from workforce and/or training entry on Long Island include childcare, transportation, training fund and income supports, and employment coaching/mentoring.
- A comprehensive suite and easy-to navigate inventory of wrapround services don't appear to be offered on Long Island, which may present a barrier for potential job seekers and social service intermediaries. Ongoing inventory and coordination across wraparound service providers and potential funding sources may result in higher utilization of available resources, and entry-level training programs.
- Not knowing where to start was noted as a top barrier for advancement in the Department of Labor Workforce Development Survey. A clear path, illustrated in an interactive-online portal, communicated by a counselor/mentor, or outlined in a training pathway could reduce this barrier to some extent. Targeted outreach to marginalized populations could also help

PluggedInVA
The PluggedInVA and Integrated Education and Training (IET) blueprint are models for career pathways that integrate academic and literacy skills, workforce preparation activities and occupation training through simultaneous co-enrollment in adult education and post-education and training.

Potential opportunities

The following are opportunities that the Long Island could explore for integrated support of historically marginalized and vulnerable populations.

- **Inventory and map regional wraparound services with pathways to advancement.**

  An aggregation and regional mapping of wraparound services may better direct potential job seekers, especially in historically marginalized communities, to the available resources in their area. Such a tool may also identify duplication, gaps, and opportunities for partnership between stakeholders in the workforce ecosystem. Including supports and career pathways by specific need would also be useful.

  Potential partners: NYS DOL and other government-affiliated workforce agencies, social services, non-profits and community-based organizations

- **Identify solutions to greatest barriers and integrate into training programs.**

  Integrating wraparound services with short-term skills training could increase participation and successful completion of programs. In some instances, the EAC is already supporting these types of services, but they could be expanded. These services could be covered by additional grant/program funding or employer contributions.

  Potential partners: NYS DOL and other government-affiliated workforce agencies, industry partners and associations, chambers of commerce, community-based organizations, social services, municipal leaders

- **Engage employers in remedial training and support programs for targeted populations.**

  The knowledge, skills, and support received in these programs translate to better outcomes and could be a stepping-stone to short-term industry-specific trainings that could result in direct-hire opportunities in the future. Connecting these remedial trainings or participants to formal industry trainings is an important priority and requires employer engagement. This could include presentations by Advanced Manufacturing industry ambassadors with similar lived experiences, company tours, and workplace simulations that lead to future interest in the industry.

  Potential partners: Support organizations and training partners, industry partners and associations, chambers of commerce, community-based organizations, social services

- **Develop short-term, employer-engaged training relevant to the Advanced Manufacturing industry.**

  Short-term follow-on trainings connected to existing programs for marginalized and vulnerable populations could lead to better job opportunities in the Advanced Manufacturing industry. These manufacturing readiness trainings, often referred to as "bootcamps," include a combination of industry-specific and workplace-readiness skills. Employer sponsors could support these trainings with wraparound funds, ambassador/coaching time and with assured placement or interview opportunities.

  Potential partners: NYS DOL and other government-affiliated workforce agencies, community colleges, BOCES, P-TECH, school districts, employers, industry partners

- **Assess the need for a new workforce training center(s)**
  Accessibility is a significant challenge on Long Island. Developing new or expanding existing training centers near population centers with the greatest need could improve both awareness and accessibility of those opportunities.

  Potential partners: REDC (funder), NYS DOL and other government-affiliated workforce agencies, *community colleges, BOCES, P-TECH, school districts, employers, industry partners, community-based organizations*

San Francisco Citywide Workforce Services Inventory
Assembled through the City of San Francisco's Office of Economic and Workforce Development, the Committee on Citywide Workforce Alignment catalogues workforce development programs and data across 18 municipal departments on an annual basis to assess inputs, outputs, and outcomes. This coordinated effort enables the City to optimize a cohesive workforce development strategy to meet the needs of job seekers and employers.

Select examples of successful wraparound service initiatives

Coordinated services	**SURGE Center, Goodwill Industries of Greater Detroit** Designed to support employees with managing personal challenges that may impede job retention, the SURGE Center formally partners with employers through a memorandum of understanding that align with the organization's workforce goals and needs. Employees receive assistance with sourcing several resources, including reliable transportation, affordable childcare, substance abuse treatment.
Childcare	**Project Growth Business-Childcare Partnership Tool Kit, Wisconsin** Wisconsin's Project Growth grant program collateral included the Business-Childcare Partnership Tool Kit. It provides employers with strategies and resources for building childcare capacity, building partnerships, assessing financing strategies, ensuring sustainability. The toolkit can also serve childcare providers, as it defines their role in the workforce development ecosystem.
Transportation	**Corporate ESG/Social commitments, Austin, TX** As part of a local employer's ESG initiatives, $1.5 million has been earmarked for a national rideshare-sponsored program that provides reliable potential employees reliable transportation to get job training, interviews, or wraparound services. Leaders in Austin, TX have been successful in channeling a portion of that corporate investment into helping local job seekers overcome barriers to employment, including transportation.
Coaching	**Career Coach Pilot Program, Arkansas Tech Institute (ATI)** ATI, an entity of Arkansas Tech University, is executing on its regional workforce development strategy connecting students with local industry and career opportunities. Over the course of the 2022-23 school year, six career coaches will help high school seniors navigate career pathways. The career coaches are made possible partnerships between the Arkansas Department of Education, a local educational cooperative, local school districts, and the local chamber of commerce.
Income stipends	**Renewable Energy and Efficiency Workforce (RENEW) Training Program, City of Charlotte** The City of Charlotte, with the support of the Urban League of Central Carolinas, sponsors a 13-week training in the area of HVAC and electrical trades. In addition to career coaching for a paid work-based opportunity, participants earn an educational stipend of $15/hour during the training period.

Goal 4: Establish pathways to direct employment and growth opportunities

Work-based learning is a proven solution for increasing the skilled workforce in Advanced Manufacturing and heavily utilized in states with growing manufacturing sectors. Traditional opportunities include internships, cooperative work experiences, and apprenticeships. Newer approaches such as hackathons, competitions, and special projects have emerged in recent years and are often used as career awareness tools.

In our conversations with Advanced Manufacturing employers from Long Island, they recognized the importance of work-based learning opportunities but expressed hesitancy in utilizing them because of perception issues, the complexity and level of paperwork involved, and the dedication of staff to support them. Case in point: Registered Apprenticeships (RAPs) in the region are highly concentrated in one industry, Construction, and appear to be underutilized by all other sectors.

Training does not end once employment begins, and reskilling plays an important role in employee advancement and industry competitiveness, especially in sectors undergoing significant transformation, like Industry 4.0 in Advanced Manufacturing. While robotic automation is not yet on the radar of many employers on Long Island, at least a third of them are planning to incorporate more digital automation in the next two year, based on results from the Workforce Development Job Seeker and Business Survey completed by the New York Department of Labor.

Increasing the buy-in, support, and promotion of work-based learning and reskilling opportunities could support more placement of Long Islanders into higher-paying career opportunities within the Advanced Manufacturing industry and a more competitive industry as a whole.

Here are some considerations when implementing work-based learning and reskilling opportunities:

- **Investing in employees' career development and supporting a culture of continuous learning** are some of the most effective ways to retain talent, according to leaders of the Society for Human Resource Management. in 2022.[1]
- **Employer engagement is essential to development and support of work-based learning and other training programs**. Employers inform the types of training needed, provide equipment for training purposes, and dedicate employee time to execute and participate in trainings. Given the upfront investment by employers, **substantial support for implementation is critical, as well as education on the long-term benefits** of work-based learning and training opportunities.
- Awareness of these opportunities to potential and existing employees is a critical piece of the puzzle. Like employers, **participants need to understand the opportunities available and the long-term benefits of participation**. These opportunities can be promoted on a central career platform, at career events, through targeted outreach programs, or at internal employer events.
- **Accessibility is key.** Many work-based learning or reskilling opportunities require classroom training, but scheduling conflicts and transportation could limit participation. Time away from the job due to travel might also be a consideration. More accessible training could resemble funding for an on-site training facility, options for virtual instruction, access to self-guided online training, or after-hours training. Many if not all of these would require investments in space, equipment, curriculum, and instructors.
- There is an opportunity cost for employees engaging in sponsored and non-sponsored trainings. **Scholarships or stipends could reduce those costs and provide incentive** for participation.

[1] Source: #SHRM22: Increase Retention in The Workplace: 14 Effective Strategies | #CauseTheEffect Brett Farmiloe, April 13 2022, The SHRM Blog

Assessment of work-based learning and reskilling opportunities on Long Island

The utilization of work-based learning and reskilling opportunities was one aspect of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from that research were:

- Despite regional, state, and federal supports and incentives, manufacturers on Long Island expressed a disinterest in apprenticeships and other work-based learning due to perception issues, the complexity and level of paperwork involved, and the dedication of staff to support them.

  Some of those supports include:

  - Ignite Long Island's partnership in the Manufacturing Intermediary Apprenticeship Program (MIAP), an initiative that is working to increase Registered Apprenticeships in manufacturing for the state of New York.
  - New York State's support and financial incentives for apprenticeship and pre-apprenticeship programs in the Advanced Manufacturing sector, including up to $5,000 per apprentice for approved education through the State University of New York (SUNY).
  - The federal government's recently announced programs and incentives such as the Apprenticeship Accelerator and the Apprenticeship Ambassador Initiative to increase the number of Registered Apprenticeships and pre-apprenticeships available.
- Awareness of these opportunities is a challenge, like other opportunities within the sector. A singular platform and outreach program for all opportunities within the Advanced Manufacturing could alleviate this issue.

Potential opportunities

The following are opportunities that Long Island could explore to enhance support and buy-in for expanded learning opportunities in Advanced Manufacturing.

- **Explore opportunities to implement cooperative (co-op) education programs in manufacturing disciplines.**

  Co-op programming is characterized by close collaboration between institutions of higher education or training organizations, and employers. Traditionally, co-ops combine classroom instruction in varying modalities with hands-on learning as a part-time or full-time employee with an employer. It is common for co-op students to receive academic credit for demonstrated competencies during employment. Most co-ops provide financial support or sponsorship of students, sometimes in the form of stipends, allowances for tuition and books, or traditional wage scales paid by the employer. In many cases, internships have replaced co-ops, but a recent resurgence among employers seeking talent solutions has shown promise for this model.

  Potential partners: New York Department of Labor and other government-affiliated workforce agencies, major industry associations and employers, related technical instruction providers and higher education partners

- **Develop tools and specific outreach programs to promote apprenticeships and other forms of work-based learning.**

  Employers need more support and a better understanding of the value of apprenticeships and other forms of work-based learning. As the number of these opportunities expand, inclusion on a broader sector opportunity platform is imperative to raise awareness. A campaign or targeted outreach program, like "apprenticeship signing days" may also be necessary to shift perception.

  Apprenticeship programs could support in-demand occupations like general machinist, industrial production technicians, industrial machinery maintenance workers and welders.

  The development of a program that aggregates apprenticeship opportunities could leverage leading practices that surface from the following initiatives:

  - The American Apprenticeship Initiative
  - Women in Apprenticeship and Nontraditional Occupations
  - NY College Apprenticeship Network

  ### Apprenticeships evolved

  Organizations like the Federation for Advanced Manufacturing (FAME) have developed proprietary methods, strategies, and sponsorship models that enable employers to more easily develop apprenticeships in a manner that is both compliant with United States Department of Labor (USDOL) requirements and presents the best value to the employer. In recent years, new modalities, learning systems, wage scales, and sponsorship guidelines have been enacted that make apprenticeships far easier to use.

  Potential partners: NYS DOL and other government-affiliated workforce agencies, major industry associations and employers

- **Collaborate on programming for reskilling needs.**

  Specific programming can be informed by workforce coordinator feedback, through a consortium of manufacturers, or on an employer-by-employer basis. Programming could include leadership training, digital transformation, and cybersecurity. to name a few. These programs could be hosted in-house, virtually, at training centers across Long Island, or take a hybrid approach.

  Employers could demonstrate their dedication to a culture of continuous learning by providing incentives for successful completions by way of compensation increases, time off for classes, a stipend to offset costs associated with programming, and company-wide recognition.

  Potential partners: NY DOL and other government-affiliated workforce agencies, major industry associations and employers, related technical instruction providers, local higher education partners

- **Dedicate personnel to enhance regional employer outreach, education and support.**

  As noted in Goal 1, employers need accessible, real-time information on available training programs and resources and a concierge for navigating them. These dedicated personnel can also conduct outreach and provide education and support for employers in the implementation of trainings. They could work with individual employers to develop company-specific training or with a number of manufacturers to develop shared programs. Trainings on the value of employee development and continuous learning and cost-benefit analysis tool could also be beneficial in illustrating the long-term return on investment of training.

  Potential partners: ESD, NY DOL and other government-affiliated workforce agencies, industry associations, training centers, and local IDAs

Advanced Manufacturing Strategy Implementation

Key stakeholders in the workforce ecosystem were convened to contribute to the LIREDC's annual report and to support the scope of this project. Many of those stakeholders will also play an essential role in the scaling of existing programs or the development of new programs that can make a positive impact on targeted workforce development efforts in the region. Collaboration and coordination across the workforce ecosystem will be integral to the successful launch of potential opportunities outlined in this strategy report.

A key consideration in strategy implementation will be the timelines, eligibility, and organization of tasks necessary to successfully apply for current and future programs administered by the Office of Strategic Workforce Development.

LIREDC is best positioned to serve as a champion and convener of this strategy. In doing so, it would support the regional efforts of the existing workforce ecosystem by convening partners to identify and execute initiatives aligned with the regional economic and workforce priorities. The REDC would also provide ongoing guidance regarding current and future grant programs. The following considerations and steps have been developed to assess the feasibility of current and future initiatives in an organized and quantifiable manner.

Project identification and considerations

In exploring future projects or initiatives, LIREDC, regional stakeholders, grant applicants, and others could consider:

- Does the initiative have the potential of making measurable and positive impact on the development of a workforce pipeline in the target sectors? How?
- Does the initiative clearly demonstrate value in reaching underserved populations, displaced workers, ALICE workers, the underemployed, and similar demographics?
- Will the program include business and industry support in the form of direct placement, on-the-job training, industry credentials, or assistance in the development of training capacity?
- What steps are being taken to prevent duplication of efforts in the region? What individuals, entities, or organizations can assist in determining whether an existing project should be augmented or a new project considered?

Potential implementation steps

To the extent possible, it is suggested that project ideas and potential areas of collaboration be shared with LIREDC to determine the best potential partners, identify existing and similar programs, and share guidance on the grant program and timelines. LIREDC is likely in the best position to inform potential applicants of regional, economic, and industry developments that could benefit the grant application process or achieve economies of scale in certain efforts. In some cases, project ideas may not include utilization of current OSWD grant programs.

Step 1: Convene | LIREDC supporting project leads

- Given that LIREDC has established convening ability in the region through its existing workgroups. A project sponsor could work through LIREDC or an established workgroup to initiate a project.
- Project considerations could start with identifying the stakeholders, organizations, and/or individuals who could be included in preliminary discussions. LIREDC and the Departments of Labor can serve as advisors for this process.

  For example, the establishment of an employer-sponsored, short-term training program that focuses on the rapid upskilling of recent high school graduates would likely include the following entities on Long Island: employer, local community college or university, BOCES and local school district. Additional stakeholders such as wraparound service providers, curriculum or certification bodies, or others could be included as the design of the project progresses.
- Once potential partners are identified, outreach could be conducted to convene all potential project participants.

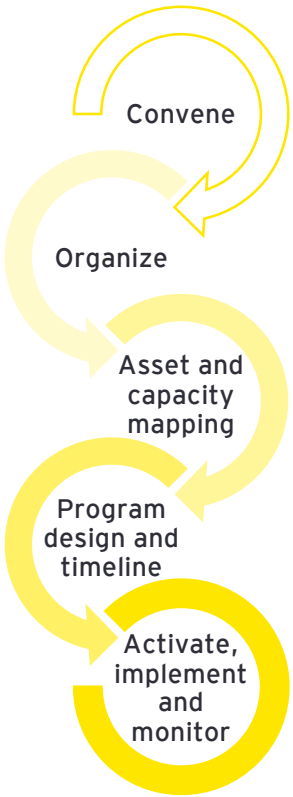
Step 2: Organize | Project leads

- Meet to discuss the project idea, scope, and preliminary goals.
- Establish the projects relevance to the identified tradable sectors, based on ESD's guidelines and priorities.
- Establish a project lead, likely based on the focus of the project.
- For example, development of a new wraparound service could be led by an existing social service organization. The development of a new apprentice program could be led by a potential sponsor or employer.
- Organize all meetings to ensure communication, documentation, agenda items, and action items are well-documented and shared.

Step 3: Inventory assets and capacities | Project leads

- Explore similar programs, leading practices, and determine required assets and capacities to successfully launch the project or initiative.

  If utilizing OSWD grant programming, follow the application, documentation, and timeline guidance provided in the grant documentation.
- Assess capacity of stakeholders, ensuring all required elements of the program are in place. As part of the assessment, consider what entities have the ability to contribute financial, in-kind, space, or other resource support that is essential for the project.
- Identify gaps in funding, capacity, expertise, and other assets necessary to launch the program.
- Conduct outreach to identify additional capacity and/or assets, utilizing the LIREDC and other regional stakeholders for connections.



Step 4: Program design and timeline | Project leads

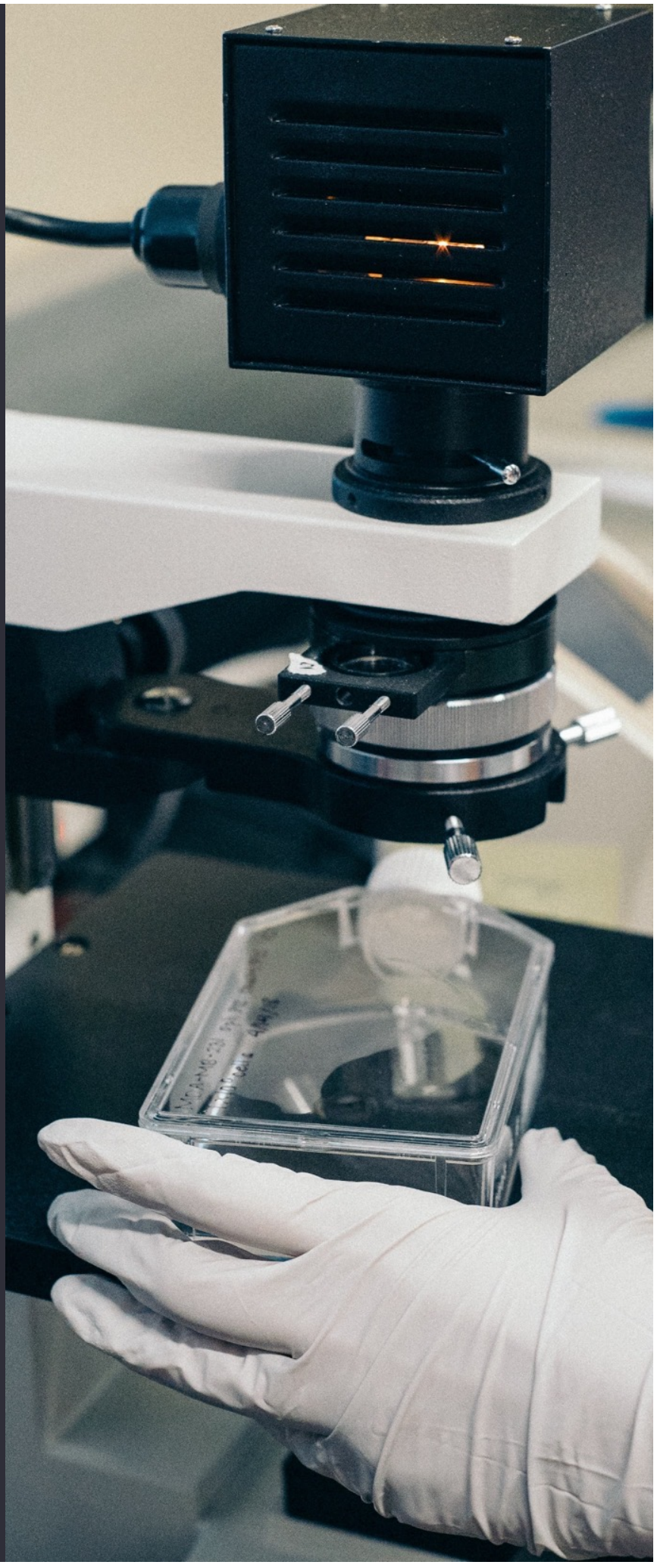
- If multiple project ideas exist, the LIREDC can support prioritization based on the significance of need, workforce priorities, and established leading practices in the region.
- Program design could account for the comprehensive life cycle of the design, launch, administration, and monitoring of the program. Grant funding will require specific plans on each component.
- Metrics of success should be determined at the beginning of a program and be human-centered and impact-focused. During the monitor portion of a program, metrics could be assessed if they adequately capture intended impact and iterated upon if better metrics are identified. These metrics will vary from program to program, depending on grant requirements and the stakeholders involved.
- Concurrent to design, all efforts could be made to establish momentum, awareness, and inclusion of underserved populations and the integration of wraparound service providers. Both digital and grassroot efforts could be considered and deployed.
- Specific timelines and goals should be created that account for program goals, partner capacities, and regional workforce priorities.

Step 5: Activate, implement, and monitor | Project leads

- Consider a launch event that can draw attention and result in immediate momentum for the project. Enlist support from industry, non-profit, educational, and government leaders.
- Monitor progress and efficacy of the program through established guidelines in operating agreements, focusing on administration and tracking of metrics and goals.
- Seek opportunities to scale the program through additional partners, assets, or marketing.

Life Science & Biotech

A workforce development strategy for the Life Science & Biotech industry on Long Island



Life Science & Biotech
Research findings

Industry overview

The Life Science & Biotech industry plays a growing role in the economy of Long Island. It represents both world-class research facilities and manufacturers of pharmaceuticals, nutraceuticals and medical devices. Recent innovation investments are expected to fuel further growth as research from the region's research facilities is commercialized into new and innovative products on the island.

Nearly 20,000 people are employed by the Life Science & Biotech industry, a number that has continued to grow over the last 10 years. Both the research and manufacturing segments have contributed to that growth. Despite some perceptions, the industry represents a wide range of career opportunities at varying education and skills levels. Opportunities span from entry-level packaging machine operators and chemical technicians to lab technicians and medical scientists with advanced degrees. Earnings in the industry are above average for the region.

The Life Science & Biotech industry is not immune to the workforce challenges of today. Employers expressed workforce challenges from entry-level manufacturing workers to post-doctoral research roles. The current workforce is split evenly between males and females and is heavily concentrated in the prime working years. Retaining this balance while developing and training the next generation of workers will be important moving forward, especially in diverse and traditionally marginalized talent pools. Doing so will require awareness, outreach, training, and support services for both the workforce and the industry.

Workforce analysis

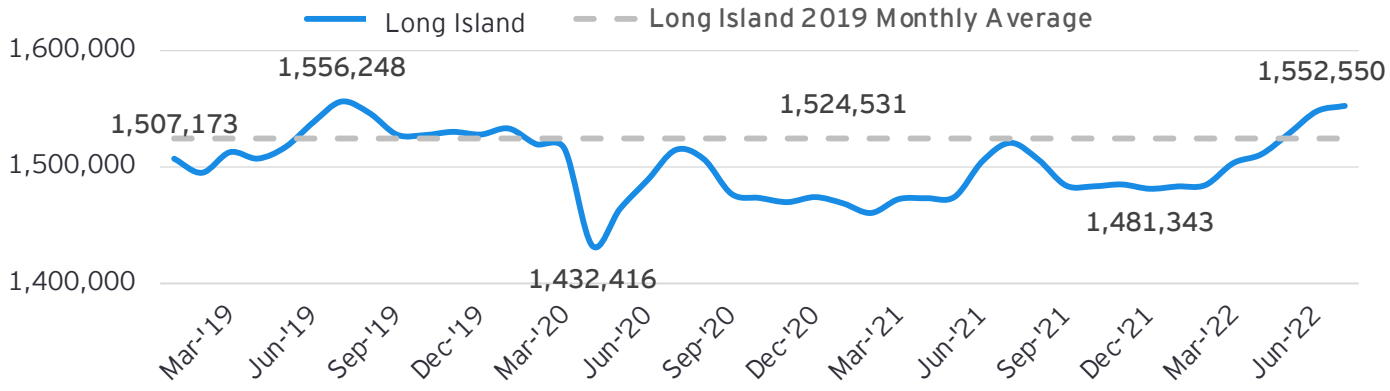
Population trends by year, age, and race/ethnicity provide insights into the region's ability to supply the labor needed to support Long Island's economy.

Unemployment and labor force participation

- Unemployment rates have steadily declined since the height of the pandemic and now hover around 3%, which is less than the state average.
- Unemployment rates decline with higher levels of education, yet less-educated workers in the region have lower unemployment than the state average.
- The labor force (those working or looking for work) on Long Island is larger than pre-pandemic levels, and the labor participation rate is higher on Long Island than the state average; still, employment in the region has yet to fully rebound to pre-pandemic levels.
- Labor participation rates on Long Island are highest for people in their prime working age (25 to 54 years old) and with higher levels of education. Still, older residents have higher participation rates than the state average.
- Labor participation rates for minorities on Long Island are much higher than the state average, while white participation is on par with the state.

More people are either working or looking for work on Long Island than before the pandemic.

Labor force size by month, Jan. 2019 – July 2022



Source:
US Bureau of Labor Statistics

Population trends

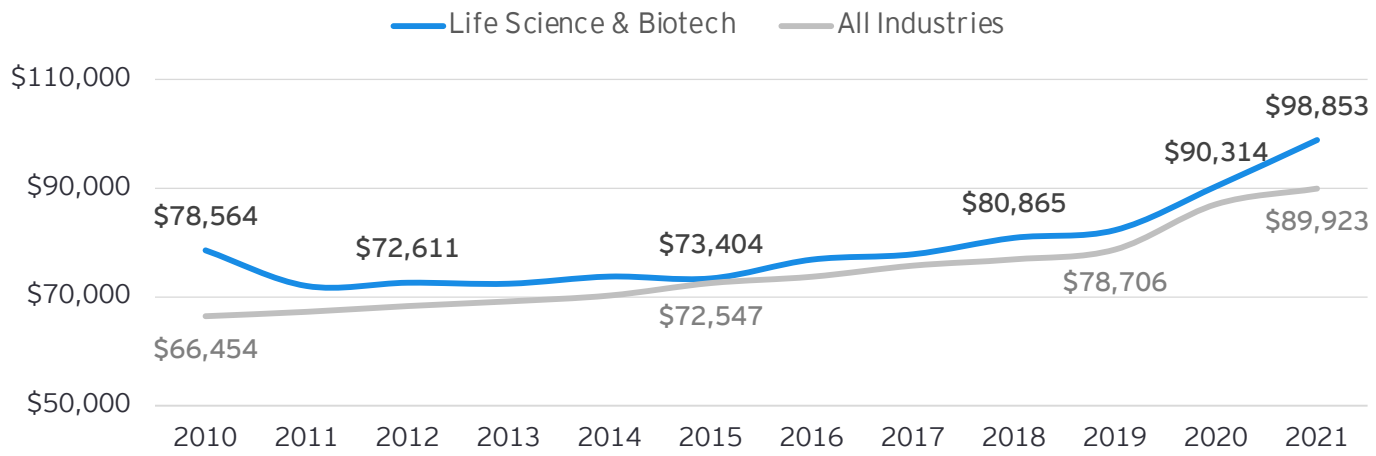
- The population on Long Island is predominantly white (62%) but is increasing in diversity. While the white population declined over the last five years, all other races and ethnicities grew, including a 19% growth in the Asian population and 9% growth in the Hispanic population.
- Long Island's population slowly declined last decade but rebounded in 2021 after the pandemic. Nassau County experienced nominal population growth over the last 10 years, while Suffolk County experienced a small decline.
- Long Island has an aging workforce. Its share of people 45 years or older is slightly higher than the statewide average (46% versus 44%), and its share of young professionals (25 to 44 years old) is lower (24% versus 27%).
- Long Island's retiree population (65 years old or older) has grown the fastest in the past five years, followed by those 25 to 44 years old. All other population groups have declined.

Industry analysis

Examining the overall trends facing the Life Science & Biotech industry sheds light on the region's competitive advantage to recruit, expand, and retain high-impact businesses that invest in the tax base. Equally important, these enterprises present an opportunity to offer high-quality, in-demand jobs for Long Island's unemployed, underserved, and underrepresented populations.

- The Life Science & Biotech sector employs nearly 20,000 and saw an 18% growth in jobs between 2012 and 2022. The number of firms in the sector grew by 13% over the same period.
- Over the last five years, Pharmaceutical Preparation Manufacturing and Medical Laboratories added the most jobs in the sector (1,580 and 582 jobs, respectively). More than half of jobs within the Life Science & Biotech sector are concentrated within those subsectors.
  - At $98,853, average annual earnings in the industry exceeded the average of all industries in the region ($89,923).
  - The sector's talent pipeline is distributed evenly between those in prime working years (25 to 44 years old) and those in their later prime (45 to 64 years old), but there is an opportunity to bolster the early career pipeline (19 to 24 years old).
  - Long Island's gender split within Life Science & Biotech mirrors the overall workforce, with just a slightly higher share of male employment.

Average annual earnings, 2010 – 2021



Source: Lightcast

Earnings in Advanced Manufacturing are higher than the regional average

Occupational analysis

Talent development requires coordination amongst employers, educators, and training facilities. Maintaining a system-wide understanding of staffing patterns, typical entry level education, and potential earnings helps to preserve a talent pipeline that's responsive to the needs of employers and job seekers.

- There are job opportunities across each level of educational attainment in the sector. For entry-level positions with a high school diploma or less, the sector offers median hourly earnings of $22.88.
- Occupations in Life Science & Biotech are diverse across education levels, with machine operators leading high school-level jobs and laboratory technicians, operations managers, and chemists leading bachelor's-level jobs.
- For positions requiring a high school diploma or equivalent, most jobs in Life Science & Biotech are for machine operators, inspectors and clerks, production supervisors, and customer service.
- For certificate or associate's level positions, most jobs in Life Science & Biotech are for phlebotomists, radiology techs, and sonographers (working in diagnostic labs). Manufacturing locations need technicians of various skill sets (chemical and industrial).
- For positions requiring a bachelor's or more advanced degrees, most jobs in Life Science & Biotech are for technologists, operations managers, chemists and medical scientists, and biotechnicians.

Educational programming observations

A region's ability to produce talent across the entire labor spectrum is closely linked to its ability to sustain economic growth. Analyzing the output from Long Island's educational programming provides insights on labor shortages, misalignment with employer needs, and clarity into workforce development investments.

General

- The population on Long Island is well-educated, with nearly 42% of adults (25 years old or older) having a bachelor's or higher (compared with 37% for the state). The share of adults with that level of educational attainment has increased over time.
- More students on Long Island are part-time than seen across the state (5% more are part-time locally). Conversely, the region has a smaller share of full-time students (48.8%) and graduate students (18.6%) enrolled in higher education institutions compared with the state (52.5% and 19.5%, respectively).
- Regional degree production is concentrated at the baccalaureate and graduate level: Over 70% of all accredited certificates and degrees produced on Long Island are at the bachelor's level or higher.
- Health programs on Long Island produce the highest number of graduates by far, with all levels of education well-represented from certificates to doctorates. Business programs produce the next highest number of graduates, followed by Liberal Arts and Education. Computer/IT and Engineering reflect a relatively small share of all graduates.
- Accredited certificate production is highest for one-year programs (42.3%), but shorter-term programs account for a majority of all certificates produced (54%).
- Registered apprenticeship programs on Long Island have expanded to their highest levels since 2016, growing by more than 88%. Program growth between 2020 and 2021 is an impressive 47% year-over-year.
- New apprenticeships are concentrated in the skilled trades: Electrician programs receive the most new apprentices each year in the state, followed by Construction Laborers, and Sheet Metal Workers. Triple-digit increases in new apprentices have occurred across six occupations.

Educational programming observations

Industry-specific

- Life Science & Biotech firms require diverse occupations and skill levels to fill jobs in their facilities. Our gap analysis shows that Long Island does not produce enough graduates for Associate's-level positions, but Bachelor's graduates are sufficient to meet demand (which may be affected by graduates' plans to commute or relocate).
- Certificate-level positions appear in-balance with local job openings. **Medical Secretaries, Medical Equipment Specialists, Medical Records** programs produce sufficient or more graduates for the Long Island economy. **Industrial Machinery Maintenance** programs appear to be unavailable.
- Associate's level positions appear to be the most underserved by local programs, including **Chemical/Science Technicians** and **Equipment Technologists**. Bachelor's graduates are generally in-balance with local demand, with the exception of **Chemists.** Advanced positions such as **Medical Scientists** are slightly underserved, and **Math/Computer Scientists** appear oversupplied (but could be impacted by talent retention issues)
- Registered apprenticeship programs on Long Island have expanded to their highest levels since 2016, growing by more than 88%. But, new apprenticeships are concentrated in the skilled trades: Electrician programs receive the most new apprentices each year in the state, followed by Construction Laborers and Sheet Metal Workers.

Supply-Demand Gap Conditions
Life Science & Biotech, Long Island

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US
	Medical Secretaries	High School	1,030	215	21%	108%
	Medical Equipment Specialists	Certificate	248	202	81%	247%
	Medical Records and Health Informatio	Certificate	127	265	209%	104%
	Industrial Machinery Maintenance	Certificate	181	0	0%	0%
	Chemical Technicians	Associate's	42	0	0%	0%
	Science Technicians	Associate's	95	16	17%	20%
	Clinical Laboratory Technologists	Associate's	312	86	28%	72%
	Radiologic/Nuclear Technologists	Associate's	321	98	31%	44%
	Diagnostic Medical Sonographers	Associate's	123	48	39%	57%
	Accountants & Tax Examiners	Bachelor's	1,294	473	37%	75%
	Operations Research Analysts	Bachelor's	45	0	0%	0%
	Biological Technicians	Bachelor's	96	988	1025%	98%
	Chemists	Bachelor's	87	129	149%	66%
	Industrial Engineers	Bachelor's	81	67	83%	113%
	Microbiologists	Bachelor's	55	136	246%	88%
	Medical and Health Services Managers	Bachelor's	795	1,025	129%	97%
	Computer Systems & Information Secu	Bachelor's	477	491	103%	114%
	Mathematicians & Statisticians	Master's/Prof	117	131	112%	121%
	Medical Scientists	PhD	115	26	23%	68%
	Computer Scientists	PhD	4	41	1025%	1104%

Lg Shortage | Shortage | In-Balance | Over-Supply | Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

Ecosystem observations

An initial framework was developed to help assess the strengths, challenges, and opportunities across Long Island's regional workforce development ecosystem. This framework focused on the areas of 1) industry-informed training, 2) awareness of opportunities, and 3) wraparound services and support. The following illustration outlines the types of work within each of those focus areas.

Industry-informed training

Strengthening relationships between employers and the talent pipeline is a central component of OSWD's approach to workforce development. Alignment of industry needs with career readiness, on-the-job training, and upskilling and reskilling activities may expand career pathways for all segments of the labor force.

- Long Island has several educational institutions and research facilities serving the Life Science & Biotech industry:
  - The region's research corridor is comprised of national renowned laboratories, including Hofstra University's engineering school, Northwell Health's Feinstein Institutes for Medical Research, Stony Brook University's Center for Biotechnology, Brookhaven National Laboratory, Broad Hollow Bioscience Park and Cold Spring Harbor Laboratory.
  - Pharmaceutical/nutraceutical enhancements have been added to the curriculum in Suffolk County Community College, Nassau BOCES, and in related technical training through NYS Registered Apprenticeships.
- Government and private/non-profit organizations (e.g., Workforce Development Institute, Departments of Labor in Nassau and Suffolk County, and the three Local Workforce Development Boards) are providing workforce development funding and assistance, especially in select sectors and for target populations, but alignment of programs could be improved, more Life Science & Biotech programming created, and the levels of bureaucracy associated with some programs reduced.

Awareness of opportunities

Life Science & Biotech is a growing industry with diverse opportunities in research and production. Dedicated and coordinated campaigns, shared resources, regional initiatives, and increased employer engagement may increase awareness and participation within the industry.

- The region could benefit from an industry association dedicated to supporting Life Science & Biotech. As such, employers in the manufacturing and research side of Life Science & Biotech may have limited awareness of available resources for engaging with potential job seekers, educators, and workforce agencies. This also impacts the industry's ability to elevate its shared needs among these entities and to policymakers.
- The geography of Long Island presents challenges for accessibility. According to stakeholders and a review of background research, those challenges are further exacerbated by the number of separate entities in the workforce ecosystem that tend to work in silos. For example, Long Island is served by more than 120 school districts. The sheer number creates obstacles for collaboration, communications, deploying resources, and scaling of programs.
- The Life Science & Biotech industry could benefit from an annual showcase event seen in other targeted industries like manufacturing, but the region does have assets and events such as the SPARK! Challenge, the Medical Marvels STEM research competition, the Long Island Stem Hub, the Brookhaven National Laboratory Science Learning Center and Cold Spring Harbor's DNA Learning Center, which provide awareness and exposure opportunities for students, teachers, and parents across the region.
- The promotion of lifestyle and career opportunities is becoming increasingly necessary in communities of all sizes. However, the Long Island region is better known for its tourism than its career opportunities. For industries like Life Science & Biotech, this could limit talent attraction efforts, especially for advanced positions.

Wraparound services and support

Socioeconomic barriers may hamper target populations' ability to obtain a job in a regional tradable sector, complete a career-advancement program, or participate in the labor force. Addressing these impediments through services and programs may unlock opportunities for hidden talent and the Life Science & Biotech industry.

- A limited availability of childcare spots for new children, high cost for parents, and low wages for caretakers make it difficult for some residents with children to enter the labor force.
- Long Island is a vehicle reliant region, as 73% of commuters use vehicles to get to work. Public transportation options are limited, especially for commutes that run north to south on the island.
- Housing availability and affordability is an issue on Long Island that limits population growth, and therefore available workforce. Many stakeholders expressed a need for more housing near employment centers.
- Potential job seekers who have been out of the workforce sometimes require coaching to prepare for a job and mentoring once employed.
- Limited wraparound support services often inhibits untapped incumbent talent from workforce and/or training entry, and both job seekers and employers struggle to navigate the resources that are available.

Life Science & Biotech
Strategy framework

Industry overview

With the insights gathered through the background review and stakeholder engagement process, the following strategic framework was developed as the foundation of a sector-based workforce development plan.

The strategic framework comprises four goals, each with considerations that clarify the direction Life Science & Biotech leaders could pursue to achieve the goal. Within each goal, an assessment of activities identifies areas that are primed for change or investment. Solutions are presented as potential opportunities, which may be taken to address stated challenges and realize the goal.

Goals

1. Enhanced regional coordination in Life Science & Biotech.
2. Excitement for careers in Advanced Manufacturing.
3. Expanded training and wraparound services for underserved populations.
4. Establish pathways to direct employment and growth opportunities.

Target populations

- Asset-Limited, Income Constrained, Employed (ALICE)
- Individuals outside of the workforce
- Talent outside of college bound students
- Graduates from local colleges and universities
- Incumbent workforce

Goal 1: Enhanced regional coordination in Life Science & Biotech

Investments in workforce and economic development have been increasing over the last decade, and exponentially so with the rollout of federal relief programs like the American Rescue Plan.[3] This increase in funding illustrates the level of importance the nation and individual states put on solving the current talent shortage. However, as the focus and funding streams for workforce development increased, more organizations entered into the broader workforce ecosystem. Unfortunately, coordination and alignment of these organizations have not kept pace. As one stakeholder stated, "no one is in their lane anymore." While additional programming and funding is positive, it has also created confusion in the market for employers, potential job seekers and everyone in between as to whom to contact for help. The time has come to take pause and inventory what programs exist, what funding is available, and how resources could be used more effectively.

This is also a unique time for employers. Significant industry transformation is underway; five generations are in the workforce; there are increasingly diverse populations; and many employees and industries are still recovering from the pandemic. Attracting, retaining, developing, and managing talent in this environment can be challenging, to say the least. Leaders in Life Science & Biotech need a resource for understanding these various dynamics and what tools and leading practices exist to create a more competitive work environment and how their engagement can contribute to the building of a stronger workforce pipeline. Enhanced industry support and regional coordination are two complementary solutions for engaging and supporting employers for accomplishing these goals within Life Science & Biotech.

Here are some considerations on regional and industry coordination:

- The talent challenges facing employers on Long Island will likely not be solved by one entity alone. Solutions will require coordination and contributions from a host of partners involved in the entire workforce ecosystem — employers, educators, community-based organizations/non-profits and government workforce organizations, to name a few.
- To better understand the talent ecosystem, employers will need accessible, real-time information on available training programs and resources, plus leading practices on talent management, leadership, and new industry dynamics.
- Inventorying and assessing the programs, target populations, and funding sources of all partners in the workforce ecosystem is a critical first step in identifying gaps and opportunities and in aligning efforts moving forward. A better understanding of the available resources and their limitations will also support more effective allocation of these funds.
- Given the complexities of navigating the ever-changing ecosystem, some economic development entities have employed workforce development coordinators to serve as concierges to employers' talent needs. This is in addition to the standard business retention and expansion support (BRE).
- A single entity, like an industry association, is often charged with convening employers, educating them on relevant industry topics, activating shared initiatives, and advocating on their behalf. To be effective, these associations require adequate funding and staff.

North Carolina Biotechnology Center (NC Biotech)
NC Biotech - a state funded organization - aggregates company information for more than 2,500 companies that operate within North Carolina's Life Science & Biotech industry sector. It presents this information through a web-based tool that allows the user to search by category, region, or keyword.

[1] Source: *Jacob Stenstrom, State Investment in Workforce Development on the Rise,* The Council for Community and Community Research, *October 2019*

Assessment of regional coordination and industry support on Long Island

Regional coordination and industry support were common discussion points shared in our stakeholder conversations. Some key observations include:

- LIREDC can be a champion and convener of this strategy but would need additional resources for activation. The region could benefit from a single unified entity for convening ecosystem partners and activating a shared plan for workforce development. In other regions, this is a regional economic development organization with strong employer engagement, but such an organization does not exist on Long Island.
- The geography of Long Island presents challenges for accessibility. According to stakeholders and a review of background research, those challenges are further exacerbated by the number of separate entities in the workforce ecosystem that tend to work in silos. For example, Long Island is served by more than 120 school districts. The sheer number creates obstacles for collaboration, communications, deploying resources, and scaling of programs.
- The region could benefit from an industry association dedicated to supporting Life Science & Biotech. As such, employers in the manufacturing and research side of Life Science & Biotech may have limited awareness of available resources for engaging with potential job seekers, educators and workforce agencies. This also impacts the industry's ability to elevate their shared needs among these entities and to policymakers.

Possible opportunities:

The following are opportunities Long Island could explore to enhance regional coordination and support of Life Science & Biotech:

- **Assess the need for a regional economic development organization.**

  A regional economic development organization could provide the coordination necessary to activate elements of this goal area and support other industry strategies, but a feasibility study would need to occur first to assess the needs and interest for supporting such an organization. If established the regional organization could take on the role of establishing the workforce consortium, developing the asset map and activating the workforce coordinators. They could also serve as the convener for this and other targeted industries.

  Potential partners: Major employers, elected officials, community leaders, local chambers, economic development organizations, IDAs

- **Support a fully resourced, employer-led industry association with a complete suite of services.**

  Industry associations provide a platform for employers of all sizes to convene for discussions on leadership, talent, current skills needs, and changing industry dynamics. It can also be a platform for sharing leading practices, activating shared initiatives and enhancing overall collaboration. Such an organization could also take ownership of much of this strategy.

  Sample initiatives they could tackle:

  - Identification and awareness for engagement opportunities (e.g., industry awareness activities, industry ambassador programs, networks/initiatives for diverse populations, shared internships, post-doctorate attraction efforts)
  - Ongoing skill needs/assessment for the industry
  - Education and trainings for how to be an "employer of choice" (e.g., company culture, cultural understanding, flexible work arrangements)

  Potential partners: Employers IDAs, local chambers and economic development organizations, local and statewide industry associations

- **Establish a workforce consortium with representatives from all parts of the workforce development pipeline.**

  A workforce consortium allows for all entities engaged in the workforce pipeline to convene for awareness and assessment of current challenges and opportunities, supporting all sectors. This could include non-profits and social services organizations providing wraparound services and support for target populations, training centers and educational institutions, and government-supported workforce agencies, to name a few.

  Potential partners: all ecosystem partners

- **Develop an inventory and assessment of existing workforce programs, target populations, and funding sources.**

  A high priority task for the consortium would be to develop a comprehensive inventory that could be used to create an asset map of resources for potential jobseekers and employers but could also be the foundation for an assessment that maps funding sources, program targets and programs in an effort to identify gaps and challenges and ways to utilize resources most effectively.

  Potential partners: NYS DOL and other government-affiliated workforce agencies, NY Department of Health and Human Services, non-profits , social services, education and training providers

- **Create workforce coordinator roles to support Life Science & Biotech.**

  In order to better understand the talent ecosystem, employers will need accessible, real-time information on available training programs and resources and a concierge for navigating them. These coordinators can serve one or many industry sectors. A structured training program for these coordinators would also be beneficial.

  Potential partners: NY ESD, REDC, IDAs, local chambers and economic development organizaitons, industry associations

- **Develop coordination and sharing agreements across partners.**

  A priority task for the workforce consortium and workforce coordinators would be to create a shared agreement for how outreach is conducted, and employer needs assessed and addressed. An information sharing agreement and/or system could also reduce the number of duplicative meetings to one company.

  Potential partners: all ecosystem partners

Oklahoma Biotech Innovation Cluster Initiative (OBIC)
Led by the Oklahoma City Economic Development Foundation, the Greater OKC region was awarded $35 million in the Build Back Better Regional Challenge, which includes funding for the Biomanufacturing Workforce Training Center. The OBIC is supported by more than 40 partnerships across government, industry, education, and community.

Goal 2: Excitement for careers in the Life Science & Biotech

Limited awareness and misperceptions surrounding career opportunities was a resounding theme across Long Island. This issue was expressed across industry sectors and by employers large and small. For Life Science & Biotech, the negative perceptions of ability to succeed in the sector was specifically mentioned as a challenge. Overall, awareness was noted as a shared concern across all four regions served by EY during this project and is recognized as a nationwide issue as well. Its prominence across the regions, sectors and employers suggests that it not only be a top priority for Long Island and the Life Science & Biotech industry but for the state, as a whole.

The fairly static population growth on Long Island coupled with declines in the future talent pipeline and strong growth in the industry further stress the importance of this goal. For Life Science & Biotech, specifically, the interest in STEM education and careers is paramount given the industry's need for highly-skilled STEM talent. As such, the awareness of the career and growth opportunities within the Life Science & Biotech industry is primarily focused on the K-12 talent pipeline. However, awareness for the concentration of Life Science & Biotech opportunities on Long Island should also be elevated as a means for attracting talent from outside the region.

Here are some considerations when focused on the K-12 pipeline:

- Awareness and exposure can start at an early age with the level of employer engagement increasing over time as the students reach junior high school.
- The misperception of certain career opportunities by school administrators, teachers, and career counselors could impact students' awareness and access to valuable training and opportunities.
- Parents should not be overlooked in awareness efforts, as they often play an important role in guiding their child's future career and educational decisions.

For all audiences:

- Content should be exciting to interest students and potential job seekers in engaging in further exploration.
- Misperceptions will need to be addressed head on, both in aspects of the job and work environment and a person's ability to do the job, due to skills, resources, and networks.
- Peer experience is viewed as an effective method for helping both students and potential job seekers see themselves in an opportunity. These ambassador-type programs have been popular for the last several decades and with social media, have the potential for an even greater reach.
- Career opportunities can be a driver for talent attraction and retention efforts, but the promotion of the region/communities and its livability are also important. Many communities package this information in a live, work, and play framework.

Assessment of career awareness on Long Island

Awareness was one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways were as follows:

- Employers have an important role to play in this and every goal. Their presence and engagement in the community, participation in career awareness events and support of employees engaging in ambassador and mentoring programs are integral in creating more excitement for local careers opportunities.
- The schools provide a direct gateway to accessing students and their parents. The number of school districts and schools on Long Island create an additional barrier to employers trying to engage students as each district and school represents additional time to access and engage with students. State and regional programming could alleviate some of these accessibility challenges.
- The career awareness initiatives and resources available by school district vary by community. A shared curriculum and coordinated plan for career awareness and employer engagement could benefit those schools with less resources. In some instances, resources, equipment and initiatives could be shared across numerous districts through the local BOCES or a regional educational foundation.
- Life Science & Biotech could benefit from an annual showcase event seen in other targeted industries, like manufacturing but the region does have assets and events such as the SPARK! Challenge, the Medical Marvels STEM research competition, the Long Island Stem Hub, the Brookhaven National Laboratory Science Learning Center and Cold Spring Harbor's DNA Learning Center, which provide awareness and exposure opportunities for students, teachers, and parents across the region. Enhancing these programs and tying them to a broader employer-engaged effort will be beneficial in the future.
- Reaching and engaging the target populations will likely necessitate a well-resourced multi-media campaign and interactive platform for promoting careers and educational opportunities in the Life Science & Biotech industry. An initiative of this size could be led at the state-level with ties to regional resources and opportunities.
- The promotion of lifestyle and career opportunities are becoming increasingly necessary in communities of all sizes. However, the Long Island region is better known for its tourism than its career opportunities. For industries like Life Science & Biotech, these could limit talent attraction efforts, especially for advanced positions.

Potential opportunities

The following are opportunities Long Island could explore to increase awareness and excitement for career opportunities in the Life Science & Biotech industry:

- **Develop statewide multimedia campaign in select targeted sectors.**

  These campaigns could include testimonials from peers, videos showcasing companies, and occupations and virtual reality experiences, to name a few. Content should be optimized for various media channels and sharing platforms.

  Ideally, this content could be developed at the state level, focusing on the economic mobility of identified industry sectors, followed by regional campaigns supporting specific industry sectors. The goal of a campaign would be to dispel myths, create momentum, and generate interest in manufacturing careers.

  Potential partners: New York Empire State Development, New York Department of Labor, major industry associations, and employers

- **Launch an interactive website to showcase pathways, opportunities and resources.**

  Any multimedia campaign should direct students, parents and potential jobseekers to a landing page to further explore statewide or regional information on sector opportunities. Content should be well-designed and engaging and target to specific audiences.

  Potential partners: NY DOL and other government affiliated workforce agencies, ESD, major industry associations and employers

- **Host an annual event to showcase the Life Science & Biotech industry on Long Island.**

  An annual event to showcase the industry's presence and local career, training and work-based learning opportunities is an important step in elevating Life Science & Biotech opportunities across Long Island. This event could showcase employers and their products/research, feature competitions or award ceremonies for initiatives like the SPARK! Challenge, Medical Marvels STEM research competition, and the new life science competition (funded by the Long Island Investment Fund) and serve as a regional job fair. Moving the event throughout the region, either annually or by hosting multiple showcases, is important to accessing a broader population. An innovation challenge that brings together researchers, education, innovators and investors could be a marquee event for the annual showcase.

  Potential partners: industry employers, industry association or chambers, school districts, BOCES, higher education partners

My Colorado Journey
My Colorado Journey is an interactive and consolidated platform that connects potential job seekers to individualized career, training, and educational resources. By centralizing educational and training programs, users spend less time searching for in-demand career options and pathways. Several state agencies provided coordinated support for the tool.

- **Develop a regional plan for employer engagement and career awareness for the K-12 pipeline.**

  This plan could outline how to coordinate, build upon, and align STEM education curriculum, STEM competitions, and career awareness and exposure events at early age, middle school, junior high and high school. Initiatives could occur in individual schools, at a broader community level or regionally. The audience would include administrators, career counselors, parents, and students. The plan could also include resource sharing. In some instances, new programs could be piloted in one district or school then scaled accordingly.

  Potential partners: NY DOL and other government affiliated workforce agencies, NYS Education Department, NYS School Boards Association, school districts, BOCES, P-TECH, major industry associations, employers, and learning centers/labs and educational non-profits

- **Expand dual enrollment, job shadowing, experiential learning, and pre-apprenticeship programming.**

  Promoting and scaling dual-enrollment programs in technical disciplines can create accelerated pathways for high school graduates who are not university bound. Coupled with job shadowing, experiential learning, and pre-apprenticeships, this approach could positively impact the industry's ability to attract more students. The challenge here is to connect these events back to actual career opportunities.

  Potential partners: BOCES, PTECH, school districts, employers and industry partners

PluggedInVA
The PluggedInVA and Integrated Education and Training (IET) blueprint are models for career pathways that integrate academic and literacy skills, workforce preparation activities and occupation training through simultaneous co-enrollment in adult education and post-education and training.

- **Establish local ambassador training programs.**

  Industry ambassadors can provide a deeper connection to the reality of a potential job opportunity. A regional program utilizing industry representatives as proponents of advanced manufacturing careers could train and deploy others with the faces, voices, and stories of local communities and target populations. Their stories are most powerful when told in person and could be featured in marketing materials. Long Island's population is growing in diversity and could benefit greatly from scaling existing programs that are focused on better understanding the needs of various cultures. In addition, reaching individuals through community and faith-based organizations with the message of attainable employment pathways can prove to be effective.

  Potential partners: Industry associations and employers, chambers of commerce, economic development organizations

Goal 3: Enhanced training and wraparound services for underserved populations

The size of Long Island's labor force has now exceeded pre-pandemic levels and labor force participation rates are above statewide averages across nearly every race and ethnicity. Yet, employers on Long Island continue to face a shortage of applicants and qualified candidates. Equitable outcomes have also become a priority of state and federal administrations. Oftentimes, these traditionally underserved or marginalized groups have limited information or awareness of the available career pathways; and when upskilling or job opportunities are presented, they may require a package of services and support to forgo short term gains (e.g., unemployment benefits, low wage, non-career jobs) in exchange for long-term success.

Bringing more potential job seekers into careers in into Life Sciences and Biotech, especially in historically marginalized communities, will necessitate an alignment of awareness, opportunity, wraparound supports and placement. This alignment will require investment and coordination by all partners in the workforce ecosystem, including employers.

Here are some considerations for aligning these efforts:

- **Some populations require unique resources and supports** to address challenges related to education and skill level, language, culture, legal, or health issues. Some of these supports may need to occur prior to or in parallel to a short-term training program.
- Potential job seekers may respond more positively to **human-centered assistance that helps them navigate** the wraparound services offered in the region. Additionally, **wraparound services should be easy to navigate** and access, especially for unemployed, underemployed, and historically marginalized communities.
- It is common for wraparound services to be created and deployed independent of corresponding training programs. For the highest participation and awareness among vulnerable populations, consider **embedding wraparound services as a part of short-term training programs**, and the necessary collaboration to accomplish that should be a focus area. These services may include subsidized childcare, transportation stipends, free or reduced programming, and meal vouchers.
- **Employer engagement in all levels of training programs is essential to future placement**. This could include curriculum development, simulated workplace experiences and tours, and presentations by industry ambassadors with similar backgrounds. Direct-hire support from training programs is also considered a leading practice.
- The "benefits cliff," or the offset in subsidized income associated with a small wage increase, creates a perverse disincentive for potential job seekers. **Utilizing tools like a benefits cliff calculator can help employers make better-informed decisions** when setting entry and mid-level wages.
- The **need for wraparound services doesn't end at the completion of a skills training program or gainful employment**. Rather, employers' job placement practices may shift to meet job candidates where they may be in their career readiness. Years of additional support may be needed after the employee starts their job, as the barriers to career mobility are often generational.

Assessment of wraparound services on Long Island

The need for supporting historically marginalized communities with integrated training and support services was highlighted in many conversations with stakeholders across the region.

Our main takeaways from those conversations were:

- There are a number of programs on Long Island that target disadvantaged and historically marginalized populations to include women in lower-income, majority-minority communities, veterans, at-risk youth, persons with disabilities, those in recovery from substance abuse and justice-involved individuals. Those programs are supported by the Empower Assist Care (EAC) Network, the Educational Opportunity Centers, BOCES and numerous programs by community-based organizations. While these programs offer valuable training and support, some of these programs stop short of industry-specific training and placement.
- The wraparound support services that most often inhibit traditionally marginalized and vulnerable populations from workforce and/or training entry on Long Island include childcare, transportation, training funds and income supports and employment coaching/mentoring.
- A comprehensive suite and easy-to navigate inventory of wrapround services don't appear to be offered on Long Island, which may present a barrier for potential job seekers and social service intermediaries. Ongoing inventory and coordination across wraparound service providers and potential funding sources may result in higher utilization of available resources, and entry-level training programs.
- Not knowing where to start was noted as a top barrier for advancement in the Department of Labor Workforce Development Survey. A clear path, illustrated in an interactive-online portal, communicated by a counselor/mentor, or outlined in a training pathway could reduce this barrier to some extent. Targeted outreach to marginalized populations could also help

San Francisco Citywide Workforce Services Inventory
Assembled through the City of San Francisco's Office of Economic and Workforce Development, the Committee on Citywide Workforce Alignment catalogues workforce development programs and data across 18 municipal departments on an annual basis to assess inputs, outputs, and outcomes. This coordinated effort enables the City to optimize a cohesive workforce development strategy to meet the needs of job seekers and employers.

Potential opportunities

The following are opportunities that the Long Island could explore for integrated support of historically marginalized and vulnerable populations.

- **Inventory and map regional wraparound services with pathways to advancement.**

  An aggregation and regional mapping of wraparound services may better direct potential job seekers, especially in historically marginalized communities, to the available resources in their area. Such a tool may also identify duplication, gaps, and opportunities for partnership between stakeholders in the workforce ecosystem. Inclusion of supports and career pathways by specific need would also be useful.

  Potential partners: NY DOL and other government-affiliated workforce agencies, social services, non-profits and community-based organizations

- **Identify solutions to greatest barriers and integrate into training programs.**

  Integrating wraparound services with short-term skills training could increase participation and successful completion of programs. In some instances, the EAC is already supporting these types of services, but they could be expanded. These services could be covered by additional grant/program funding or employer contributions.

  Potential partners: NY DOL and other government-affiliated workforce agencies, industry partners and associations, local chambers,, community-based organizations, social services, municipal leadership

- **Engage employers in remedial training and support programs for targeted populations.**

  The knowledge, skills, and support received in these programs translate to better outcomes and could be a stepping-stone to short-term industry-specific trainings that could result in direct-hire opportunities in the future. Connecting these remedial trainings or participants to formal industry trainings is important and requires employer engagement. This could include presentations by Life Science & Biotech industry ambassadors with similar lived experiences, company tours, and workplace simulations that lead to future interest in the industry.

  Potential partners: Support organizations and training partners, industry partners and associations, chambers of commerce, community-based organizations, social services

- **Develop short-term, employer-engaged training relevant to the Life Science & Biotech industry.**

  Short-term follow-on trainings connected to existing programs for marginalized and vulnerable populations could lead to better job opportunities in the Advanced Manufacturing industry. These manufacturing readiness trainings, often referred to as "bootcamps," include a combination of industry-specific and workplace-readiness skills. Employer sponsors could support these trainings with wraparound funds, ambassador/coaching time and with assured placement or interview opportunities.

  Potential partners: Community colleges, BOCES, P-TECH, school districts, employers and industry partners

- **Assess the need for a new workforce training center(s)**
  Accessibility is a significant challenge on Long Island. Developing new or expanding existing training centers near population centers with the greatest need could improve both awareness and accessibility of those opportunities.

  Potential partners: REDC (funder), NYS DOL and other government-affiliated workforce agencies, *community colleges, BOCES, P-TECH, employers, industry partners, community-based organizations*

Bioscience Core Skills Institute (BCSI)
To attract and support potential hires that may need rapid upskilling, Biotech companies may turn to the BSCI, which provides affordable, industry-informed modules that offer stackable micro-credentials. Each credential identifies specific skills and performance measurements, so potential employees and employers can make easy assessments.

Select examples of successful wraparound service initiatives

Coordinated services	**SURGE Center, Goodwill Industries of Greater Detroit** Designed to support employees with managing personal challenges that may impede job retention, the SURGE Center formally partners with employers through a memorandum of understanding that align with the organization's workforce goals and needs. Employees receive assistance with sourcing several resources, including reliable transportation, affordable childcare, substance abuse treatment.
Childcare	**Project Growth Business-Childcare Partnership Tool Kit, Wisconsin** Wisconsin's Project Growth grant program collateral included the Business-Childcare Partnership Tool Kit. It provides employers with strategies and resources for building childcare capacity, building partnerships, assessing financing strategies, ensuring sustainability. The toolkit can also serve childcare providers, as it defines their role in the workforce development ecosystem.
Transportation	**Corporate ESG/Social commitments, Austin, TX** As part of a local employer's ESG initiatives, $1.5 million has been earmarked for a national rideshare-sponsored program that provides reliable potential employees reliable transportation to get job training, interviews, or wraparound services. Leaders in Austin, TX have been successful in channeling a portion of that corporate investment into helping local job seekers overcome barriers to employment, including transportation.
Coaching	**Career Coach Pilot Program, Arkansas Tech Institute (ATI)** ATI, an entity of Arkansas Tech University, is executing on its regional workforce development strategy connecting students with local industry and career opportunities. Over the course of the 2022-23 school year, six career coaches will help high school seniors navigate career pathways. The career coaches are made possible partnerships between the Arkansas Department of Education, a local educational cooperative, local school districts, and the local chamber of commerce.
Income stipends	**Renewable Energy and Efficiency Workforce (RENEW) Training Program, City of Charlotte** The City of Charlotte, with the support of the Urban League of Central Carolinas, sponsors a 13-week training in the area of HVAC and electrical trades. In addition to career coaching for a paid work-based opportunity, participants earn an educational stipend of $15/hour during the training period.

Goal 4: Establish pathways to direct employment and growth opportunities

The Life Science & Biotech industry is a growth sector for Long Island, having experienced an 18 percent growth in jobs over the last 10 years. While the industry represents some highly skilled opportunities, job opportunities exist across every level of educational attainment for this industry. The primary goal of investments in work-based learnings and reskilling opportunities is to support a more competitive Life Science & Biotech industry while providing advancement opportunities for talent in the region.

Traditional opportunities for work-based learning include internships, cooperative work experiences and apprenticeships. Newer approaches such as hackathons, competitions, and special projects have emerged in recent years. But training does not end once employment begins; reskilling plays an important role in employee advancement and industry competitiveness, especially in innovative sectors like Life Science & Biotech and those undergoing significant transformation, like the adoption of automation and digital transformation principles. Increasing the buy-in, support, and promotion of work-based learning and reskilling opportunities could support more placement of Long Islanders into higher-paying career opportunities within the Life Science & Biotech industry.

Here are some considerations when implementing work-based learning and reskilling opportunities:

- **Investing in employees' career development and supporting a culture of continuous learning** are some of the most effective ways to retain talent, according to leaders of the Society for Human Resource Management. in 2022.[1]
- **Employer engagement is essential to development and support of work-based learning and other training programs**. Employers inform the types of training needed, provide equipment for training purposes, and dedicate employee time to execute and participate in trainings. Given the upfront investment by employers, **substantial support for implementation is critical, as well as education on the long-term benefits** of work-based learning and training opportunities.
- Awareness of these opportunities to potential and existing employees is a critical piece of the puzzle. Like employers, **participants need to understand the opportunities available and the long-term benefits of participation**. These opportunities can be promoted on a central career platform, at career events, through targeted outreach programs, or at internal employer events.
- **Accessibility is key.** Many work-based learning or reskilling opportunities require classroom training, but scheduling conflicts and transportation could limit participation. Time away from the job due to travel might also be a consideration. More accessible training could resemble funding for an on-site training facility, options for virtual instruction, access to self-guided online training, or after-hours training. Many if not all of these would require investments in space, equipment, curriculum, and instructors.
- There is an opportunity cost for employees engaging in sponsored and non-sponsored trainings. **Scholarships or stipends could reduce those costs and provide incentive** for participation.

[1] Source: #SHRM22: Increase Retention in The Workplace: 14 Effective Strategies | #CauseTheEffect Brett Farmiloe, April 13 2022, The SHRM Blog

Assessment of work-based learning and reskilling opportunities on Long Island

The utilization of work-based learning and reskilling opportunities was one aspect of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from that research were:

- The research and development subsector on Long Island has successfully implemented internships programs to fuel its future talent pipelines. Many of these internships include mentoring, continued education, income stipends, and even housing in some instances.
- Manufacturers in the pharmaceutical and nutraceutical subsector expressed a need for reskilling efforts to prepare for automation, robotics, and other sophisticated systems. Collaboration will be key in developing, funding, and supporting sustainable programs to meet this need.
- Overall, there is an opportunity to demystify direct-hire, non-traditional training, sponsorship, and apprenticeship programs that can increase skilled talent supply and support talent retention efforts in the region.
- Awareness of training opportunities is a challenge, like other opportunities within Life Science & Biotech. A singular platform and outreach program for all opportunities within the industry could alleviate this issue.

Potential opportunities

The following are opportunities that Long Island could explore to enhance support and buy-in for expanded learning opportunities on Long Island.

- **Dedicate personnel to enhance regional employer outreach, education and support.**

  As noted in Goal 1, employers need accessible, real-time information on available training programs and resources and a concierge for navigating them. These dedicated personnel can also conduct outreach and provide education and support for employers in the implementation of trainings. They could work with individual employers to develop company-specific training or with a number of manufacturers to develop shared programs. Trainings on the value of employee development and continuous learning and cost-benefit analysis tool could also be beneficial in illustrating the long-term return on investment of training.

  Potential partners: ESD, NY DOL and other government-affiliated workforce agencies, industry associations, training centers, and local IDAs

- **Collaborate on programming for upskilling potential job seekers or reskilling employees.**

  Specific programming can be informed by national industry association standards, workforce coordinator feedback or through a consortium of Life Science & Biotech companies. Programming could include leadership training, laboratory management, and cybersecurity, to name a few. These programs could be hosted in-house, virtually, at training centers across Long Island, or take a hybrid approach.

  Employers could demonstrate their dedication to a culture of continuous learning by providing incentives for successful completions by way of compensation increases, time off for classes, a stipend to offset costs associated with programming, and company-wide recognition.

  Potential partners: NY DOL and other government-affiliated workforce agencies, major industry associations and employers, related technical instruction providers, and local higher education partners

- **Support and promote internships, work-study opportunities, and formal apprenticeships.**

  These work-based learning opportunities provide valuable experience and strengthen talent retention efforts down the road. While many of the research institutes have successfully implemented internships, they noted work-study programs or cooperative education programs as a pathway for providing further financial support and employer connection while students complete their education. Lastly, apprenticeships are a vastly underutilized tool in Life Science & Biotech, much like in many other sectors. The boosting of all three tools through dedicated support from a workforce coordinator and promotion on a shared industry site could yield a stronger pipeline of talent for the industry, from inside the region and beyond.

  Potential partners: New York Department of Labor and other government-affiliated workforce agencies, major industry associations and employers, related technical instruction providers, and local higher education partners

About cooperative education programs (co-ops)
Co-op programming is characterized by close collaboration between institutions of higher education or training organizations, and employers. Traditionally, co-ops combine classroom instruction in varying modalities with hands-on learning as a part-time employee with an employer. It is not uncommon for co-op students to receive academic credit for demonstrated competencies during employment. Most co-ops provide financial support or sponsorship of students, sometimes in the form of stipends, allowances for tuition and books, or traditional wage scales paid by the employer. In many cases, internships have replaced co-ops, but a recent resurgence among employers seeking talent solutions has shown promise for this model.

Life Science & Biotech
Strategy Implementation

Key stakeholders in the workforce ecosystem were convened to both contribute to the REDC's annual report and to support the scope of this project. Many of those stakeholders will also play an essential role in the scaling of existing programs or the development of new programs that can make a positive impact on targeted workforce development efforts in the region. Collaboration and coordination across the workforce ecosystem will be integral to the successful launch of potential opportunities outlined in this strategy report.

A key consideration in strategy implementation will be the timelines, eligibility, and organization of tasks necessary to successfully apply for current and future programs administered by the Office of Strategic Workforce Development.

LIREDC is best positioned to serve as a champion and convener of this strategy. In doing so, it would support the regional efforts of the existing workforce ecosystem by convening partners to identify and execute initiatives aligned with the regional economic and workforce priorities. The REDC would also provide ongoing guidance regarding current and future grant programs. The following considerations and steps have been developed to assess the feasibility of current and future initiatives in an organized and quantifiable manner.

Project identification and considerations

In exploring future projects or initiatives, LIREDC, regional stakeholders, grant applicants, and others should consider:

- Does the initiative have the potential of making measurable and positive impact on the development of a workforce pipeline in the target sectors? How?
- Does the initiative clearly demonstrate value in reaching underserved populations, displaced workers, ALICE workers, the underemployed, and similar demographics?
- Will the program include business and industry support in the form of direct placement, on-the-job training, industry credentials, or assistance in the development of training capacity?
- What steps are being taken to prevent duplication of efforts in the region? What individuals, entities, or organizations can assist in determining whether an existing project should be augmented or a new project considered?

Potential implementation steps

To the extent possible, it is suggested that project ideas and potential collaboration be shared with LIREDC to determine the best potential partners, identify existing and similar programs, and share guidance on the grant program and timelines. LIREDC, in partnership with the local workforce development boards, is likely in the best position to inform potential applicants of regional, economic, and industry developments that could benefit the grant application process or achieve economies of scale in certain efforts. In some cases, project ideas may not include utilization of current OSWD grant programs.

Step 1: Convene | LIREDC supporting project leads

- Given that LIREDC has established convening ability in the region through its existing workgroups. A project sponsor could work through LIREDC or an established workgroup to initiate a project.
- Project considerations could start with identifying the stakeholders, organizations, and/or individuals who could be included in preliminary discussions. LIREDC and the Departments of Labor can serve as advisors for this process.

  For example, the establishment of an employer-sponsored, short-term training program that focuses on the rapid upskilling of recent high school graduates would likely include the following entities on Long Island: employer, local community college or university, BOCES and local school district. Additional stakeholders including wraparound service providers, curriculum or certification bodies, or others could be included as the design of the project progresses.
- Once potential partners are identified, outreach should be conducted to convene potential project participants.

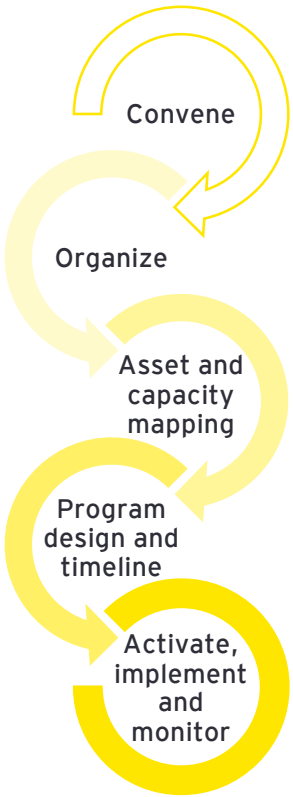
Step 2: Organize | Project leads

- Meet to discuss the project idea, scope, and preliminary goals.
- Establish the projects relevance to the identified tradable sectors, based on ESD's guidelines and priorities.
- Establish a project lead, likely based on the focus of the project.
- For example, development of a new wraparound service could be led by an existing social service organization. The development of a new apprentice program could be led by a potential sponsor or employer.
- Organize all meetings to ensure communication, documentation, agenda items, and action items are well-documented and shared.

Step 3: Inventory assets and capacities | Project leads

- Explore similar programs, leading practices, and determine required assets and capacities to successfully launch the project or initiative.

  If utilizing OSWD grant programming, follow the application, documentation, and timeline guidance provided in the grant documentation.
- Assess capacity of stakeholders, ensuring all required elements of the program are in place. As part of the assessment, consider what entities have the ability to contribute financial, in-kind, space, or other resource support that is essential for the project.
- Identify gaps in funding, capacity, expertise, and other assets necessary to launch the program.
- Conduct outreach to identify additional capacity and/or assets, utilizing LIREDC and other regional stakeholders for connections.



Step 4: Program design and timeline | Project leads

- If multiple project ideas exist, the LIREDC can support prioritization based on the significance of need, workforce priorities, and established leading practices in the region.
- Program design should account for the comprehensive life cycle of the design, launch, administration, and monitoring of the program. Grant funding will require specific plans on each component.
- Metrics of success should be determined at the beginning of a program and be human-centered and impact-focused. During the monitor portion of a program, metrics should be assessed if they adequately capture intended impact and iterated upon if better metrics are identified. These metrics will vary from program to program, depending on grant requirements and the stakeholders involved.
- Concurrent to design, all efforts should be made to establish momentum, awareness, and inclusion of underserved populations and the integration of wraparound service providers. Both digital and grassroot efforts should be considered and deployed.
- Specific timelines and goals should be created that account for program goals, partner capacities, and regional workforce priorities.

Step 5: Activate, implement, and monitor | Project leads

- Consider a launch event that can draw attention and result in immediate momentum for the project. Enlist support from industry, non-profit, educational, and government leaders.
- Monitor progress and efficacy of the program through established guidelines in operating agreements, focusing on administration and tracking of metrics and goals.
- Seek opportunities to scale the program through additional partners, assets, or marketing.

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Long Island REDC

Phase II Regional Sector-Based Strategies Appendix

Prepared by
Ernst & Young LLP
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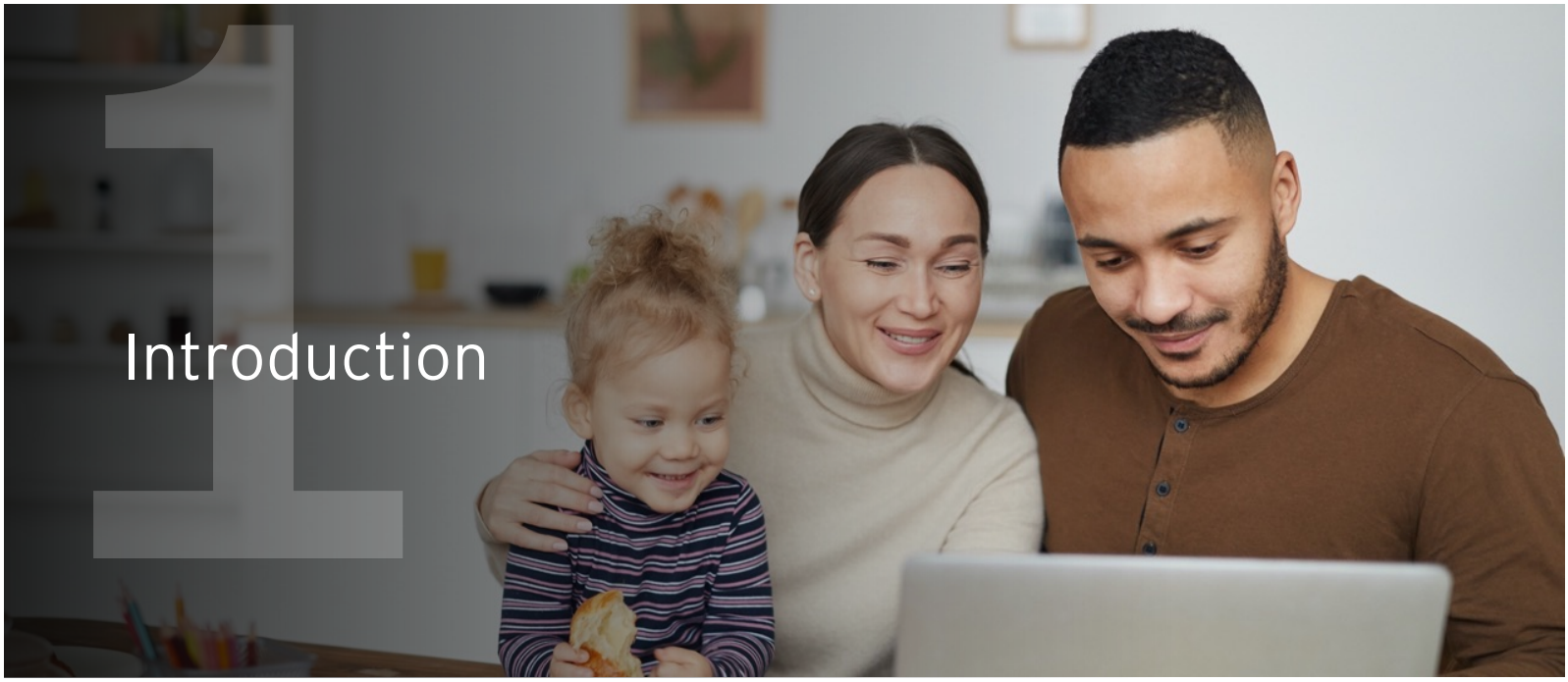
October 2022



1 Introduction

Introduction to Research Appendix

As part of the Phase II work to develop a Regional Sector-Based Workforce Development Strategy for the Long Island region of New York, EY produced new research and analysis to supplement research produced by Empire State Development (ESD) and the Regional Economic Development Council (REDC) during Phase I as well as previous reports.

This Research Appendix includes data and findings on the following:

- Regional workforce conditions
- Industry analysis on the two target sectors: Advanced Manufacturing and Life Sciences and Biotech
- Occupational analysis of the two target sectors
- Educational programming that supports overall workforce development and the programming specific to the two target sectors

This supplemental research aims help to inform the workforce development planning process and the development of strategies for each of the target sectors.

2 Regional workforce conditions

About this chapter

In this chapter, we seek to understand the social and economic trends within the region, as well as validate potential barriers facing the community. We examine components of population growth, economic indicators, potential barriers to employment and regional migration. Key metrics in this chapter include:

- Population trends by year, age, and race/ethnicity
- Monthly unemployment rate
- Size of labor force by month
- Potential barriers to employment
- Migration trends
- Unemployment by year, age, race/ethnicity, and education level
- Labor force participation rate by year, age, race/ethnicity, and education level

Insights from this analysis can provide a high-level understanding of the talent pipeline and the region's ability to supply the labor needed to support Long Island's economy.

Key findings

- Long island has seen growth in population over the past ten years with Nassau County growing at a faster rate than Suffolk County.
- Population growth has been attributed to growth in minority populations, with the Asian population experiencing the largest percentage growth.
- Still, the region is predominantly White and has smaller minority populations and relatively few foreign-born residents.
- Long Island has a higher share of older populations (45+) than the statewide average, and a lower share of young professionals (25-44).

2 Regional workforce conditions

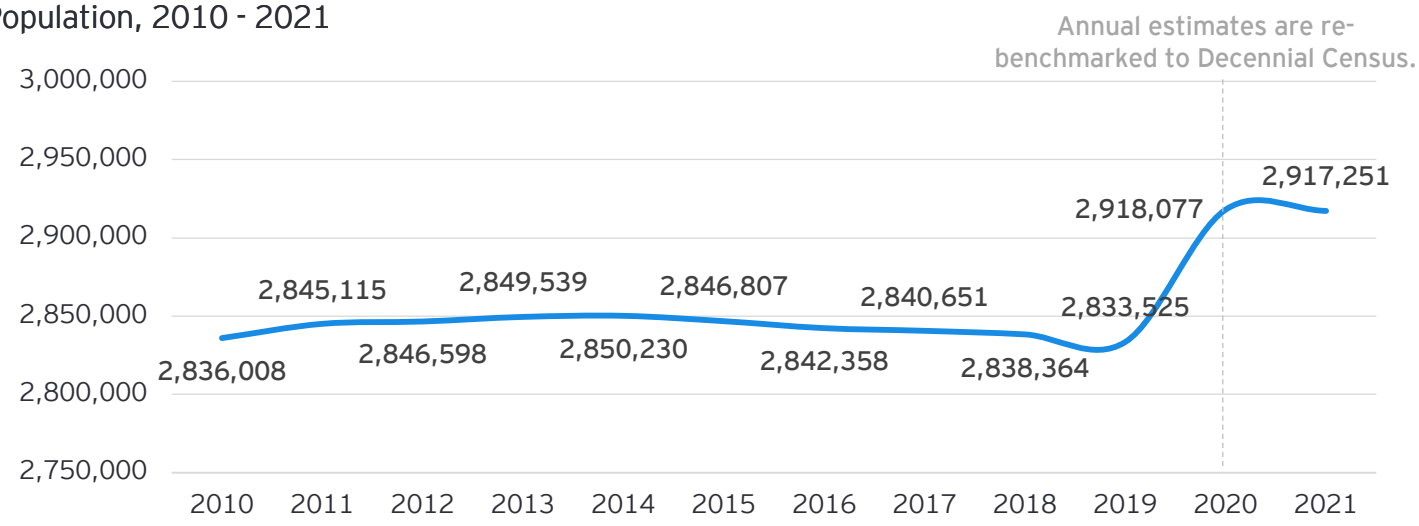
Key findings, *continued*

- Long Island enjoys much lower levels of poverty and disability than the state average.
- Labor participation rates in Long Island are higher than the state average, and unemployment is lower.
- Unemployment rates for minorities and lower-skilled workers are much lower than state averages.
- One-third of Long Island residents are employed outside the region. Most workers commuting out of Long Island (or remote workers) are in Office and Education jobs, but Protective Services and Arts are most likely to be commuters.
- Long Island's labor force (population) has exceeded pre-pandemic levels, but wage and salary jobs are still 6% below 2019. Most jobs lost are in Retail, Accommodation, and Food Services, but larger percentage declines were seen in Misc Service, Wholesale, and Government.

Workforce

Long Island's population slowly declined last decade but rebounded in 2021 after the pandemic.

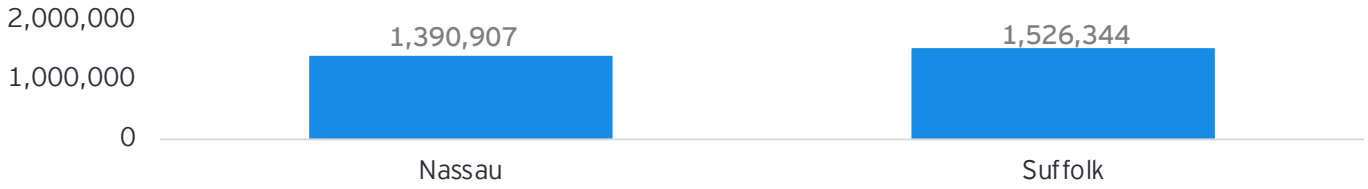
Population, 2010 - 2021



Source:
US Census Bureau

Nassau County experienced nominal population growth over the last ten years, while Suffolk County experienced a small decline.

Population, 2021



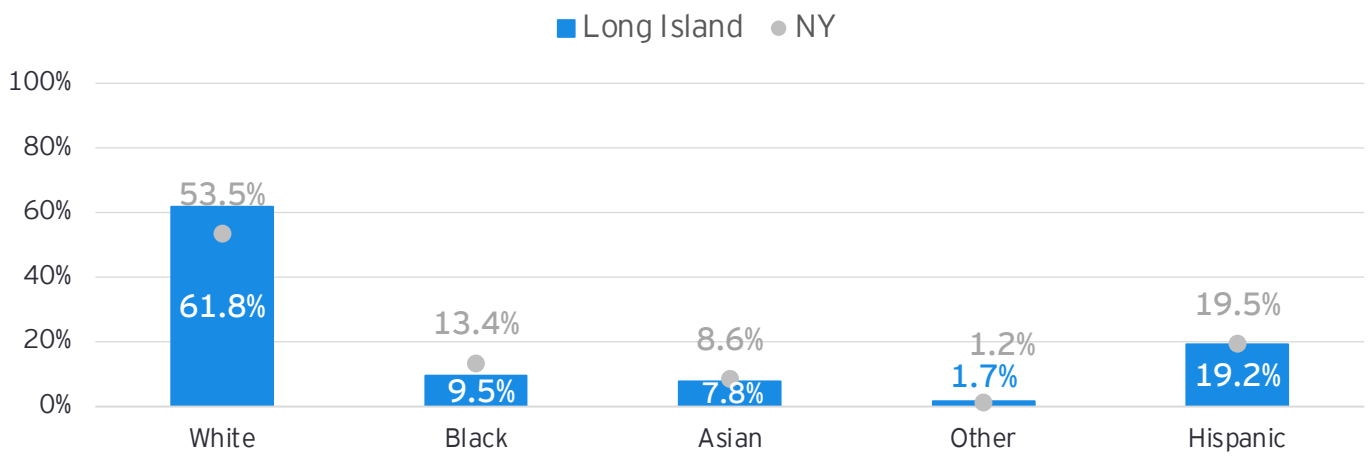
Population growth, 2011 to 2021

Source:
US Census Bureau

Workforce

The population of Long Island is less diverse than the state.

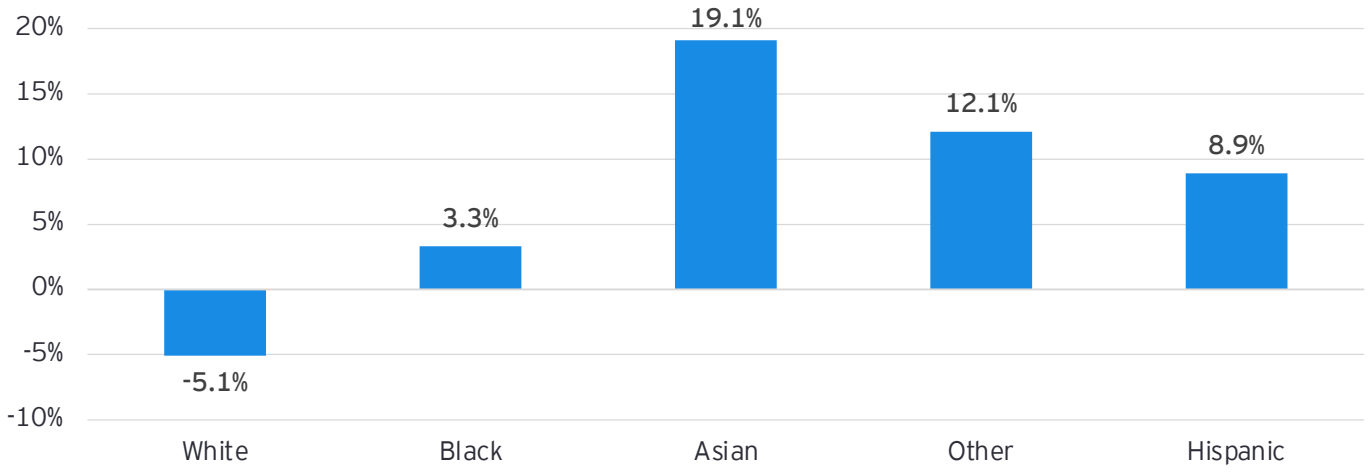
Population by race/ethnicity, 2021



Source:
US Census Bureau

The share of diversity in Long Island is increasing led by the Asian population and followed by Hispanic and Other. The White (non-Hispanic) population is declining.

Population growth by race/ethnicity, 2016 - 2021

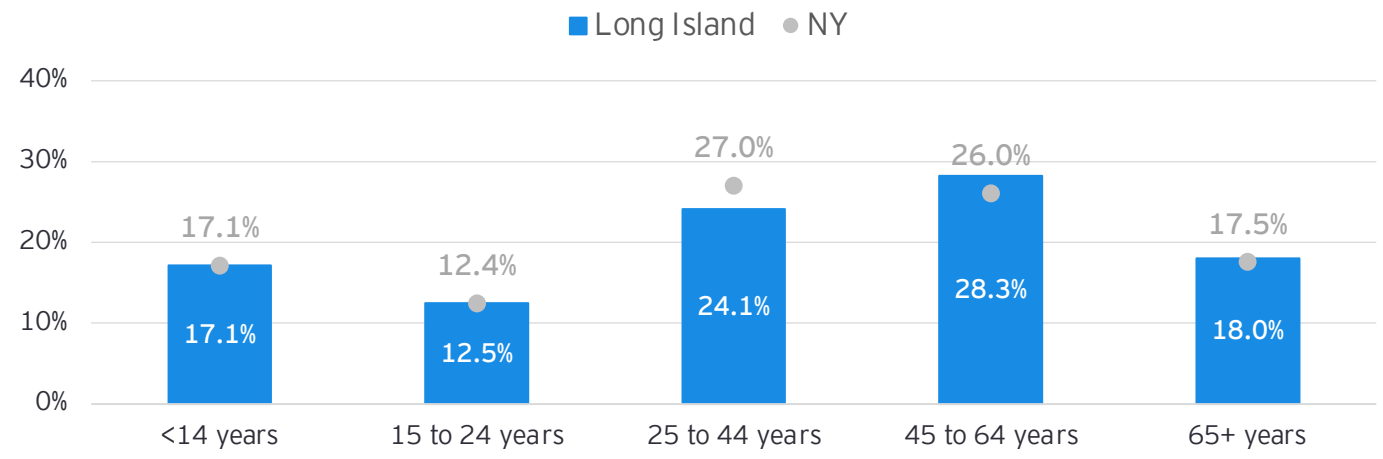


Source:
US Census Bureau

Workforce

Long Island has a higher share of older populations (45+) than the statewide average, and a lower share of young professionals (25-44).

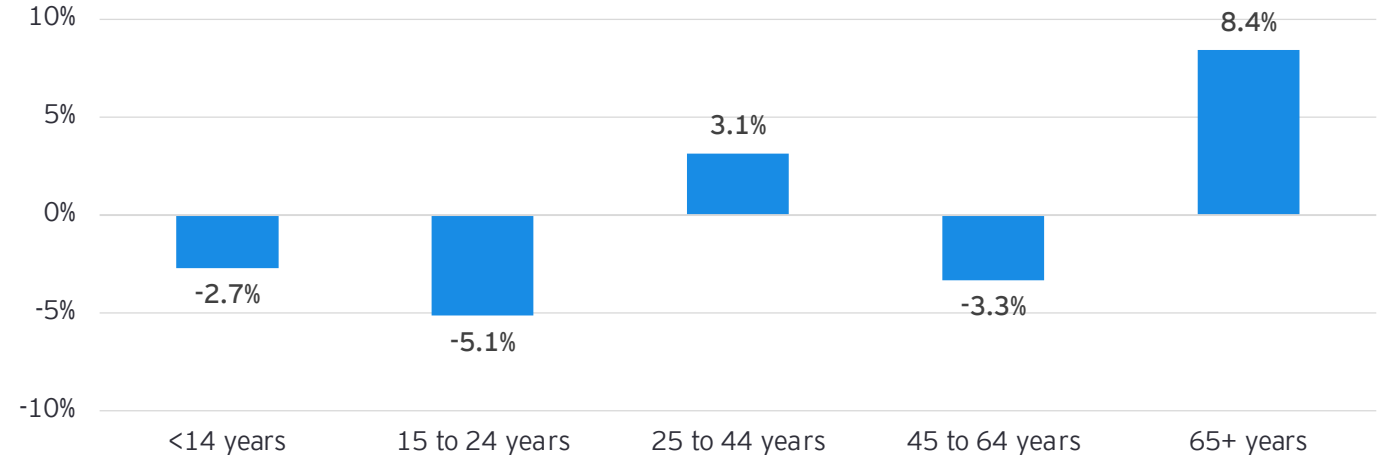
Population by age, 2021



Source:
US Census Bureau

Long Island's retirement age population (65+) has grown the fastest in the past five years, followed by populations between 25 and 44 years. All other population groups have declined.

Population growth by age, 2016 - 2021

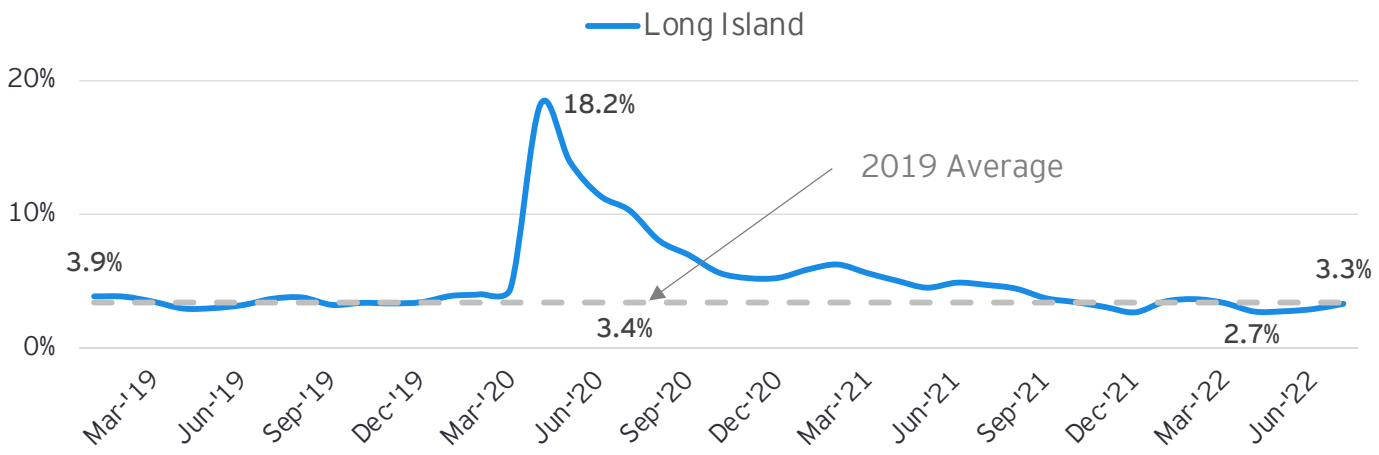


Source:
US Census Bureau

Workforce

The unemployment rate in Long Island has fallen below pre-pandemic levels.

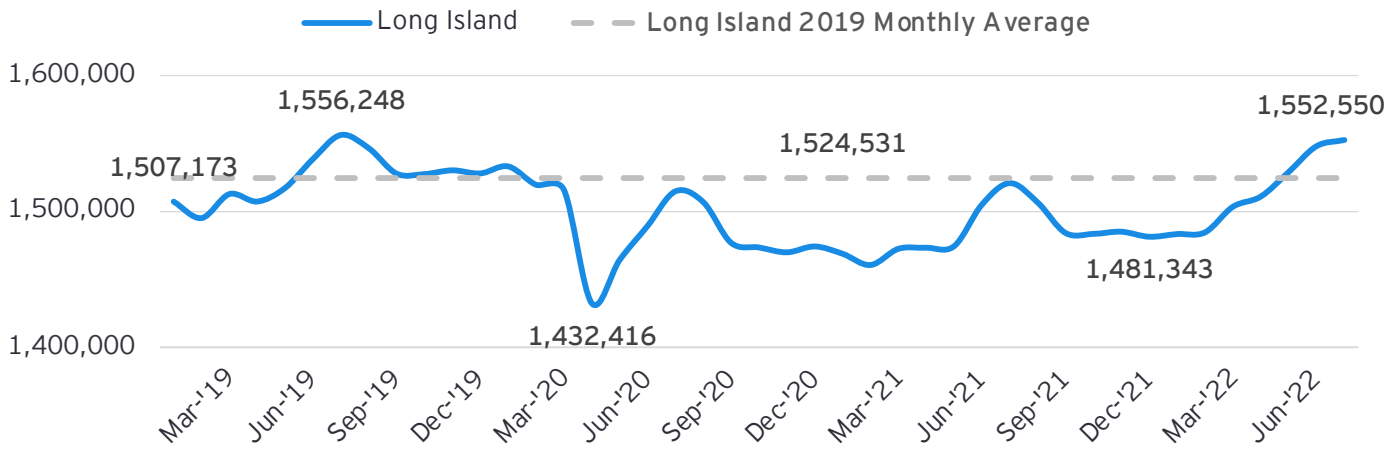
Unemployment rate by month, Jan. 2019 – July 2022



Source:
US Bureau of Labor Statistics

The labor force (those working or looking for work) in Long Island is larger than pre-pandemic levels.

Labor force size by month, Jan. 2019 – July 2022

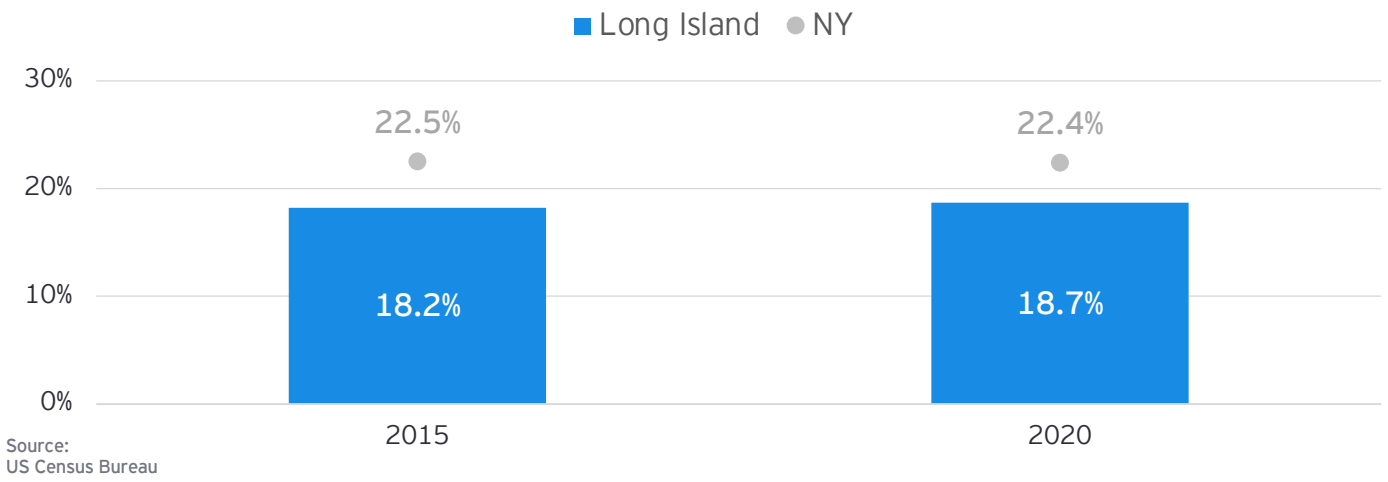


Source:
US Bureau of Labor Statistics

Workforce

The foreign-born population in Long Island has grown slightly from 2015 to 2020.

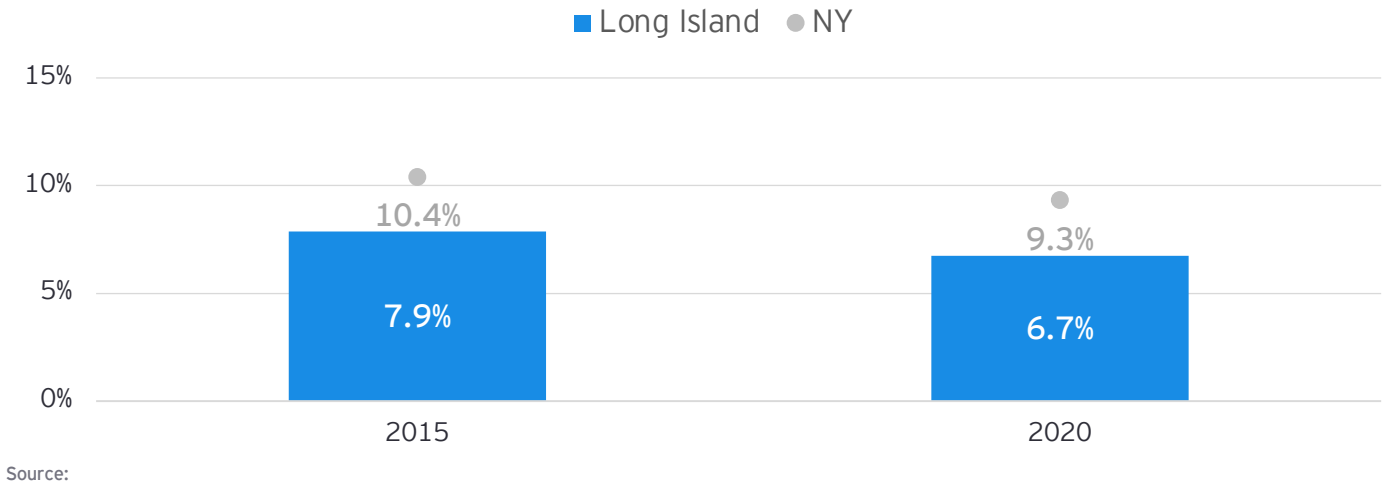
Foreign born as % share of population, 2015 - 2020



Source:
US Census Bureau

The number of non-U.S. citizens in Long Island has decreased from 2015 to 2020.

Non-citizens as % share of population, 2015 - 2020

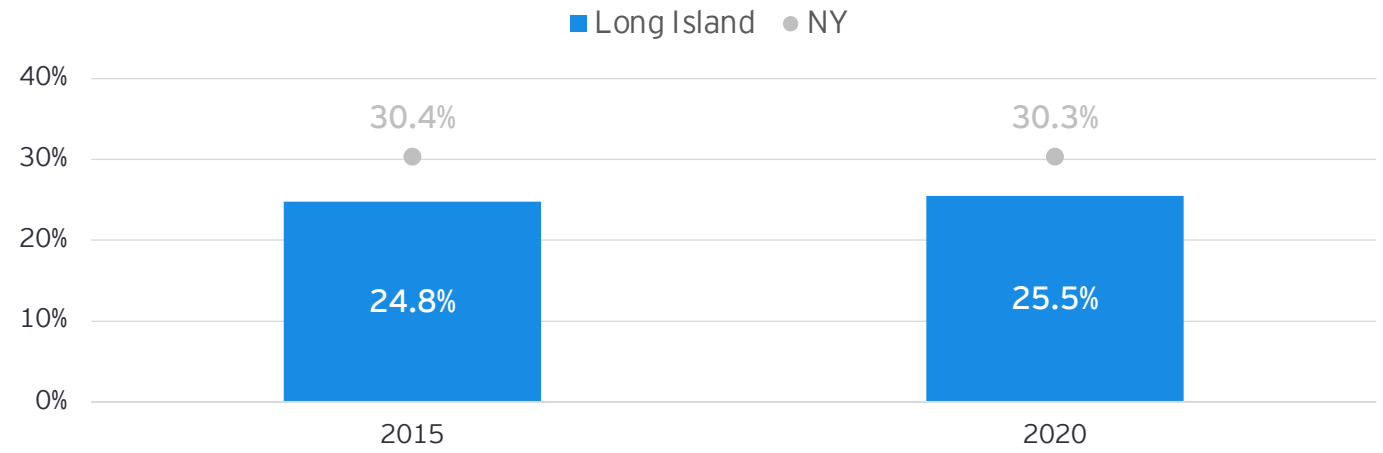


Source:
US Census Bureau

Workforce

The number of people in Long Island speaking a language other than English has grown from 2015 to 2020.

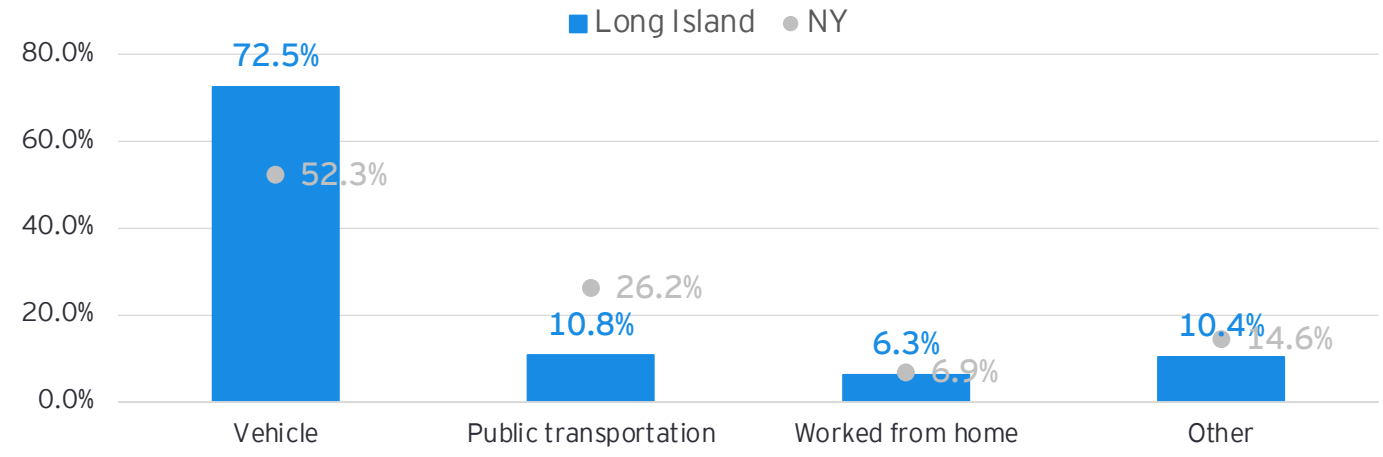
% of population that speaks a language other that English at home, 2015 - 2020



Source:
US Census Bureau

Long Islanders are heavily dependent on cars for their commute.

Modes of transportation to work, 2020

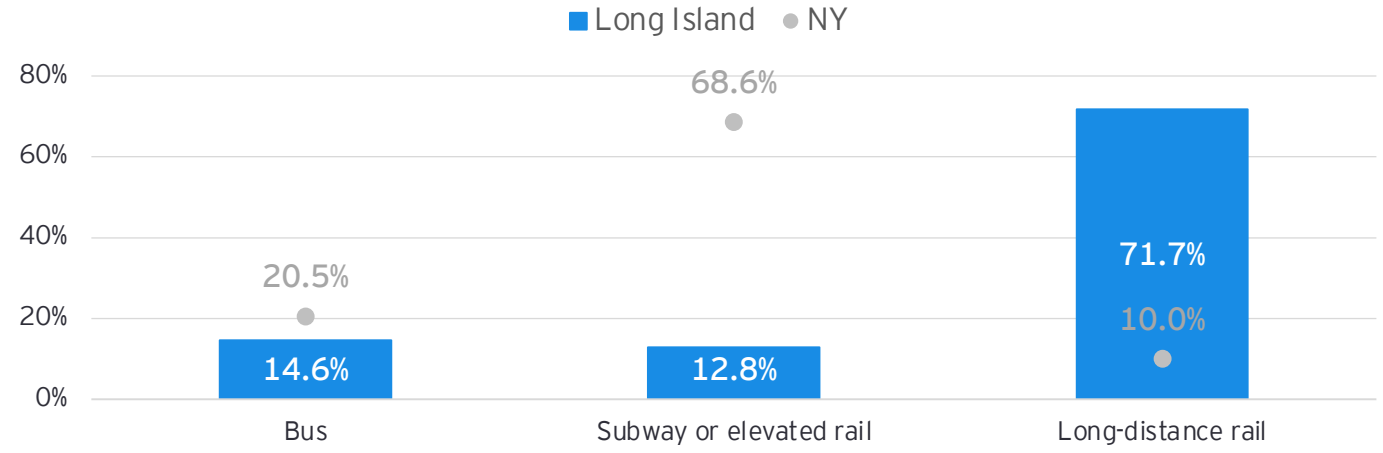


Source:
US Census Bureau

Workforce

Long Islanders using public transportation mostly use long-distance rail.

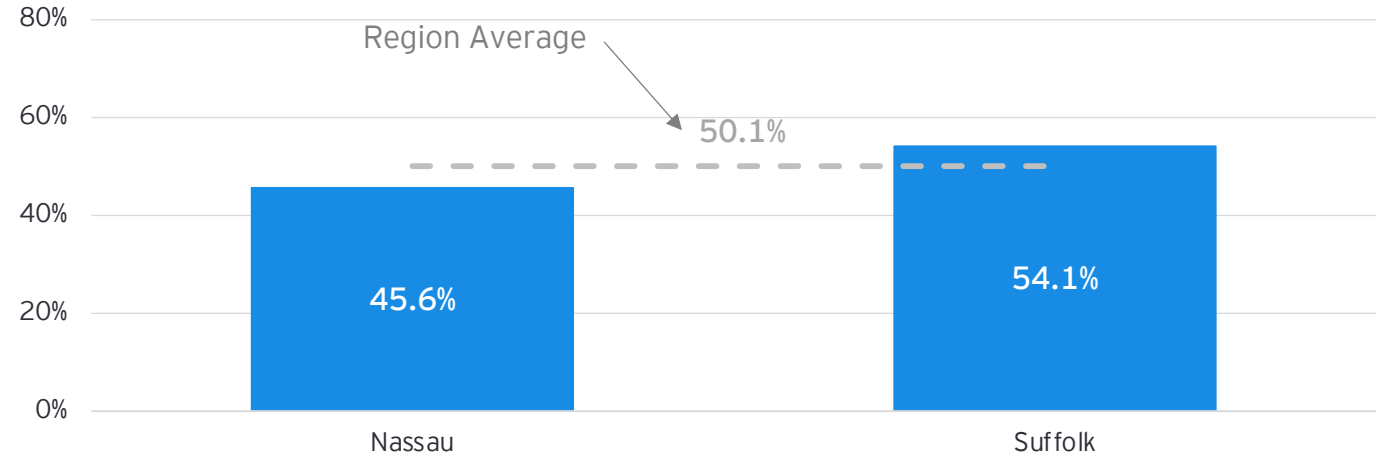
Types of public transportation used as share of total public transportation, 2020



Source:
US Census Bureau

Half of Long Island commuters have a commute of 30 minutes or less.

Share of commutes less than 30 minutes, 2020

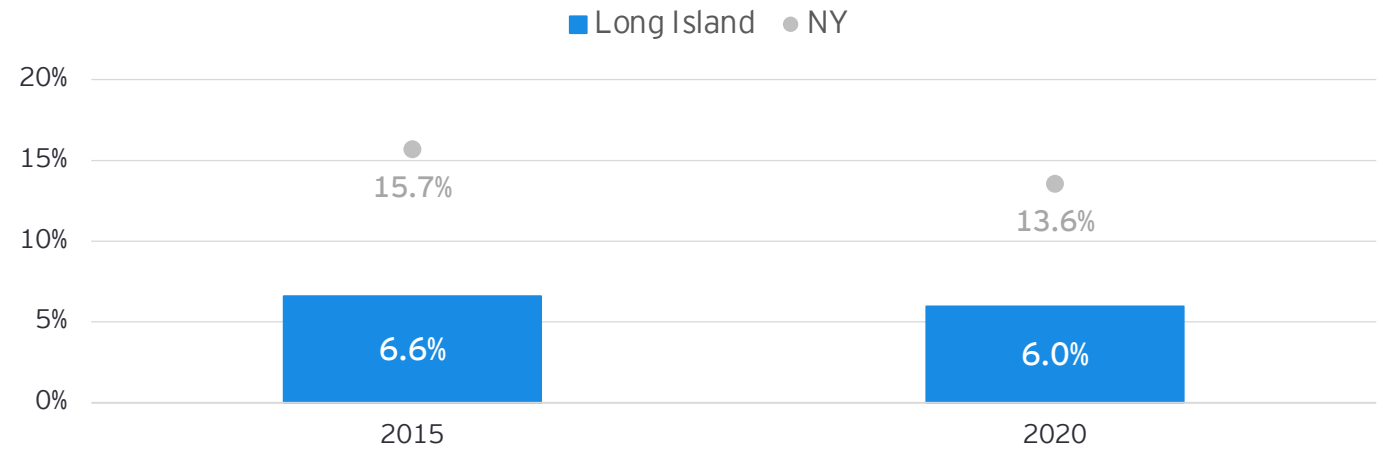


Source:
US Census Bureau

Workforce

Poverty levels are decreasing in Long Island and are much lower than the state average.

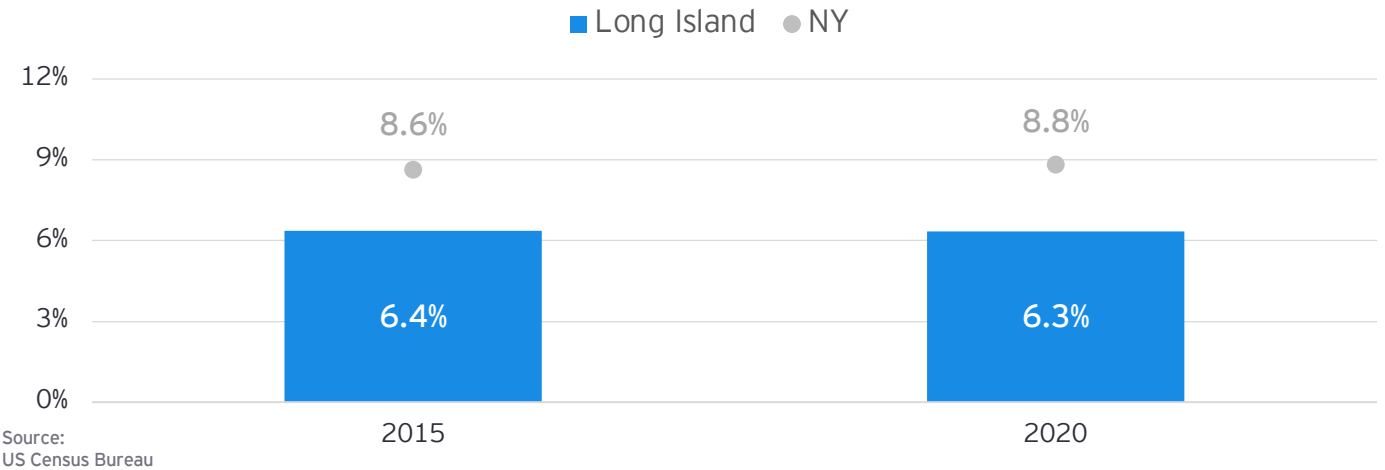
% of residents living in poverty, 2020



Source:
US Census Bureau

Just over 6% of Long Island residents have a disability, a lower share than the state average.

Percentage of population with a disability, 2015 - 2020

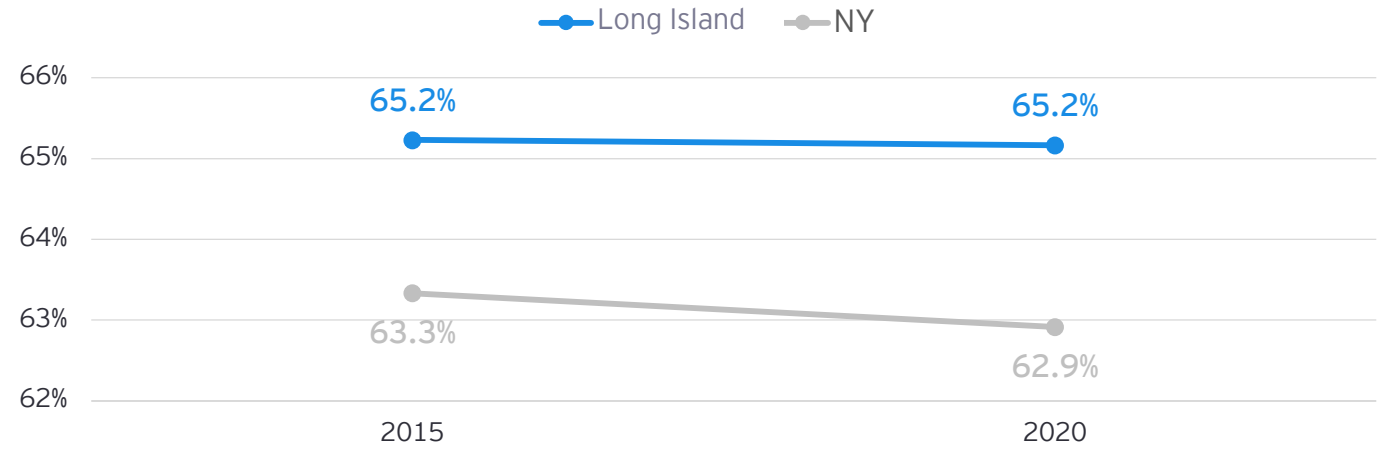


Source:
US Census Bureau

Workforce

The labor participation rate is higher in Long Island than the state average. Just over two-thirds of residents of working age (16+) are in the labor force (either working or looking for work).

Civilian labor force participation rate 16+ years of age, 2015 - 2020

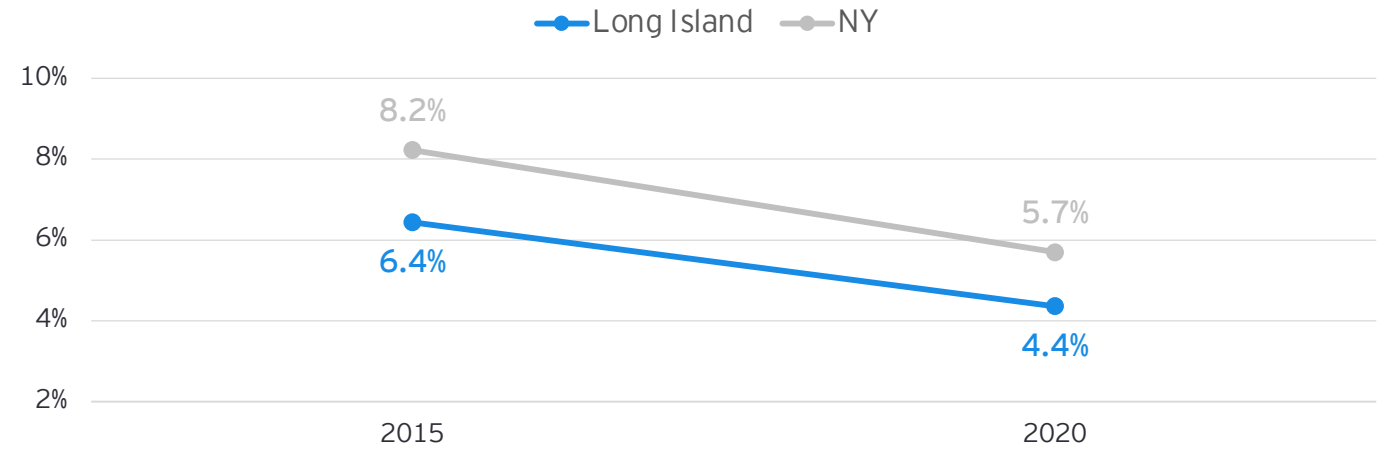


Source:
US Census Bureau

Note:
Data for counties X and Y are 5-year trailing averages due to small county sample size.

The unemployment rate in Long Island has decreased from 2015 to 2020 and is lower than the state average.

Unemployment rate 16+ years of age, 2015 - 2020

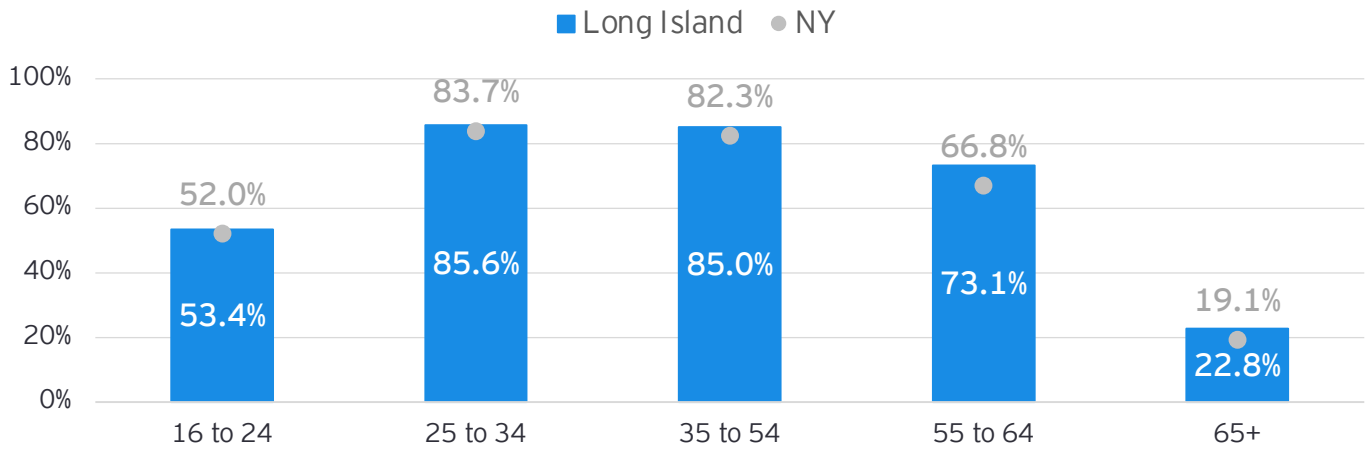


Source:
US Census Bureau

Workforce

Labor participation rates in Long Island are highest for people in their prime working age (25-54). Still, older residents have higher participation rates than the state average.

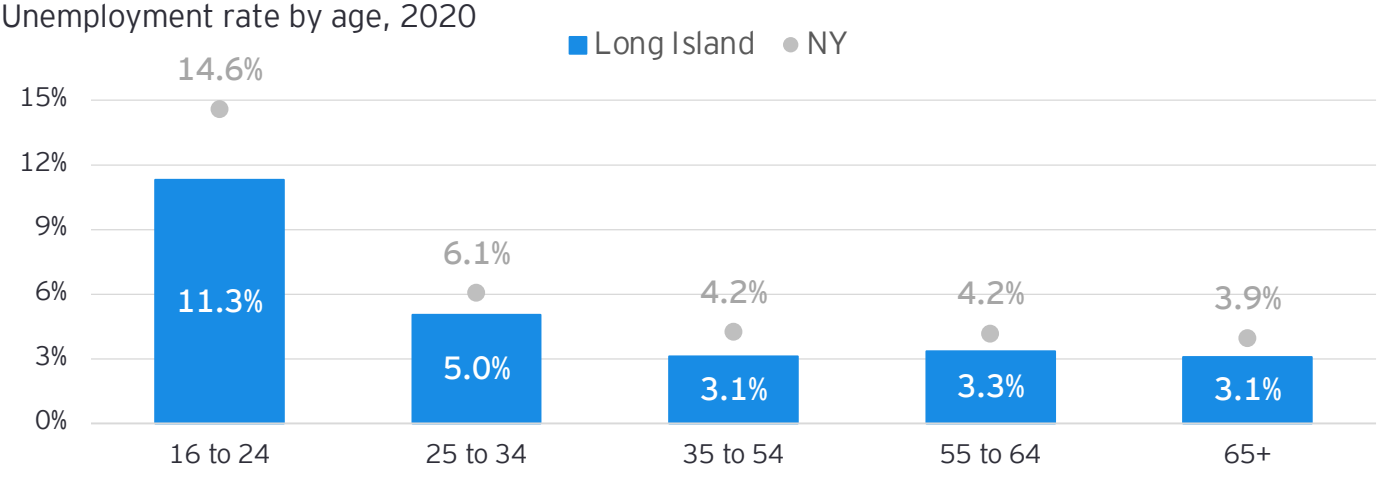
Labor force participation rate by age, 2020



Source:
US Census Bureau

The unemployment rate in Long Island declines as people get older, and unemployment for younger population is in the region is lower than the state average.

Unemployment rate by age, 2020

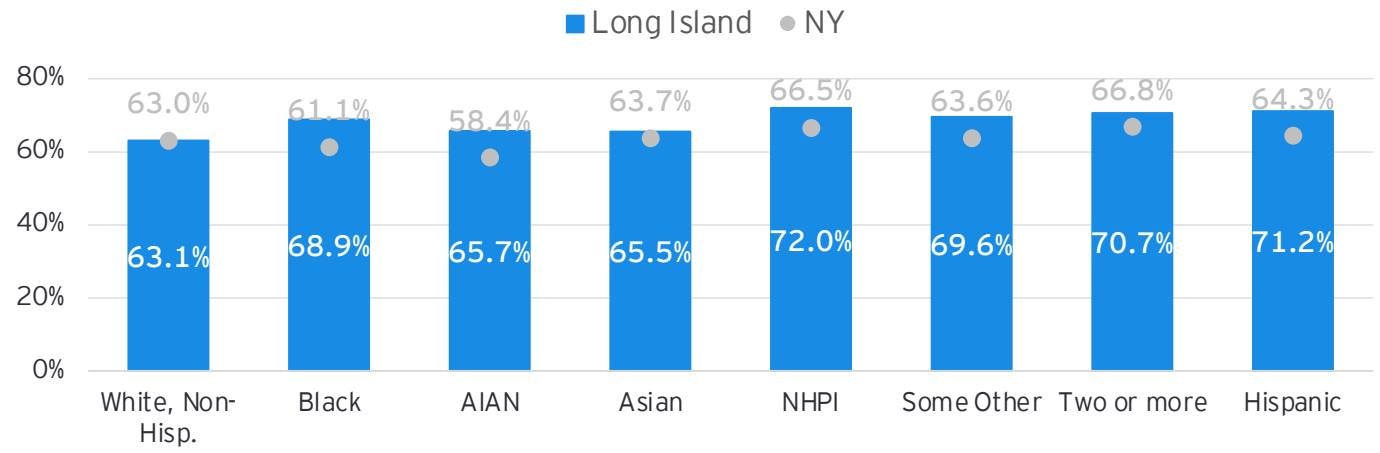


Source:
US Census Bureau

Workforce

Labor participation rates for minorities in Long Island are much higher than the state average. White participation is on par with the state but lower than non-White participation in the region.

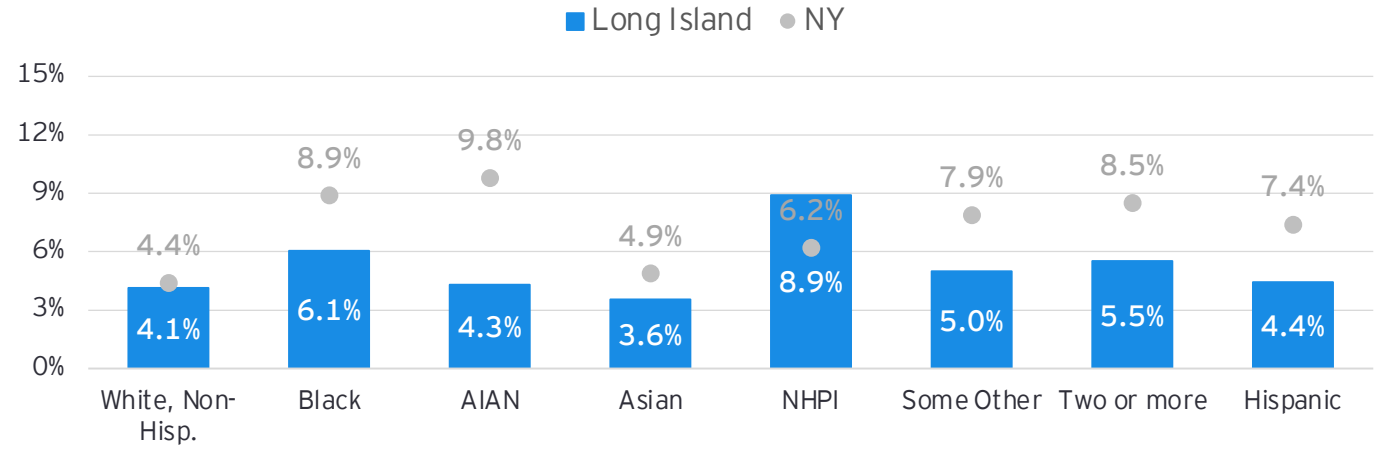
Labor force participation rate by race/ethnicity, 2020



Source:
US Census Bureau

Unemployment rates for minorities in Long Island are significantly lower than the state average (exception: Pacific Islanders), but White Non-Hispanic unemployment is only slightly lower than the state average.

Unemployment rate by race/ethnicity, 2020

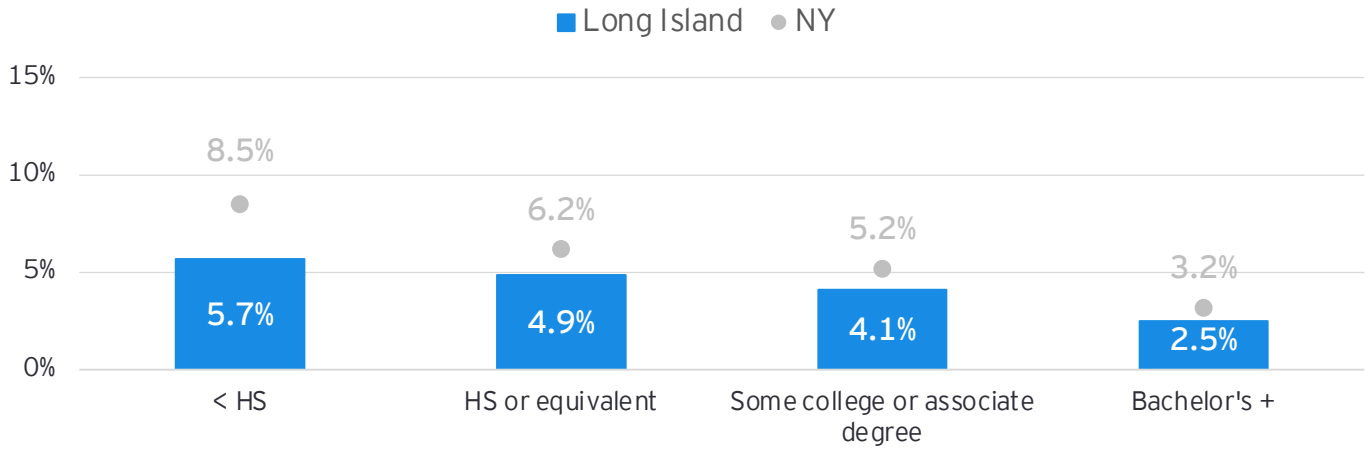


Source:
US Census Bureau

Workforce

Unemployment rates decline with higher levels of education, yet less-educated workers in the region have lower unemployment than the state average.

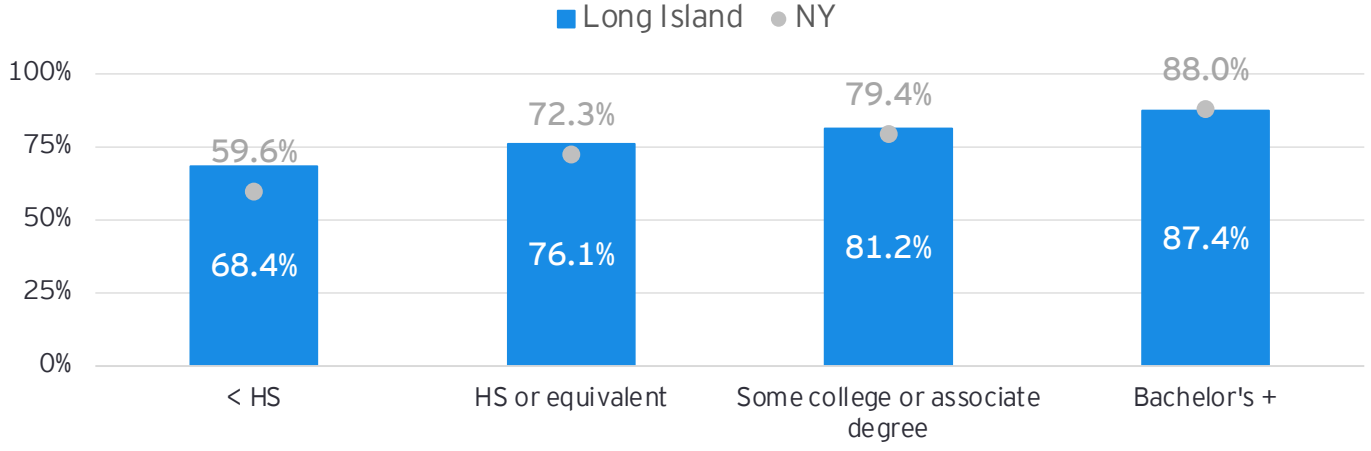
Unemployment rate by educational attainment, 2020



Source:
US Census Bureau

Labor force participation rates in Long Island increase significantly for workers with more education.

Labor force participation rate by educational attainment (aged 25 to 64), 2020

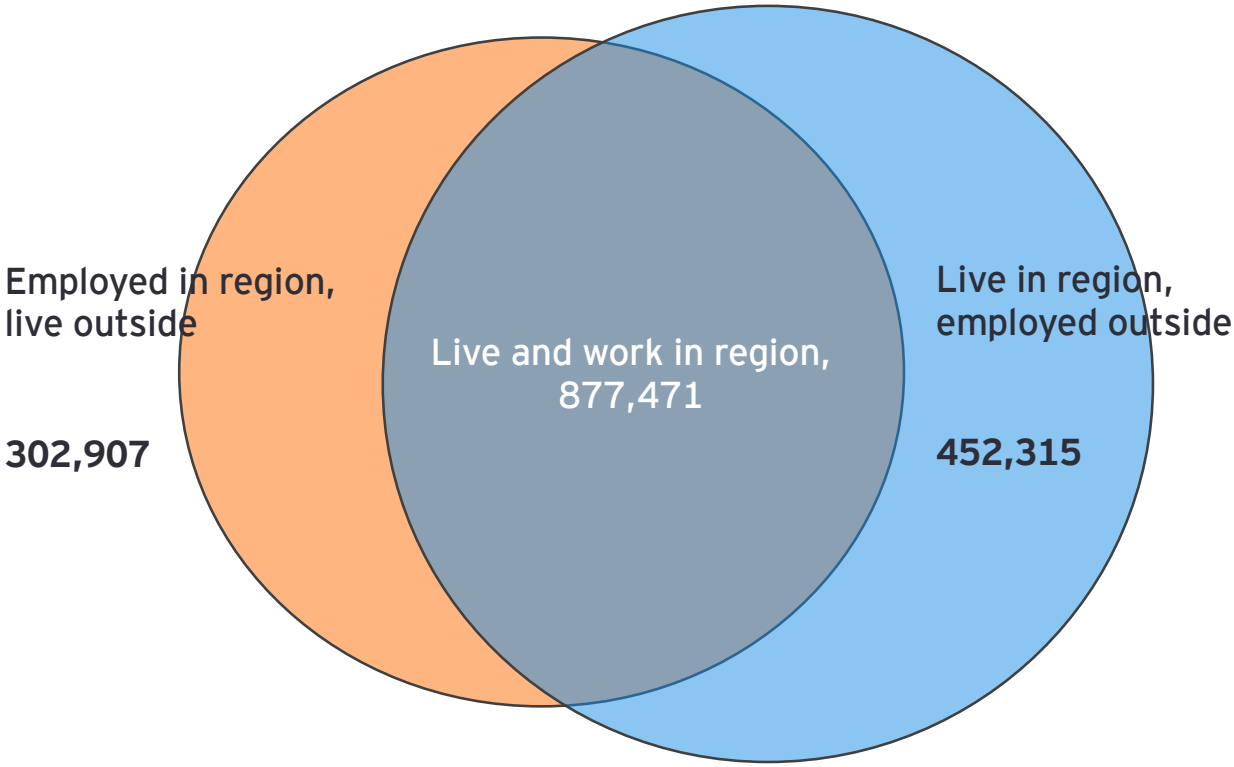


Source:
US Census Bureau

Workforce

Long Island exports many more workers than it imports. Thirty-four percent (34%) of workers living in Long Island commute out of the region every day. A much smaller percentage of workers commute in.

Talent inflow/outflow, 2019

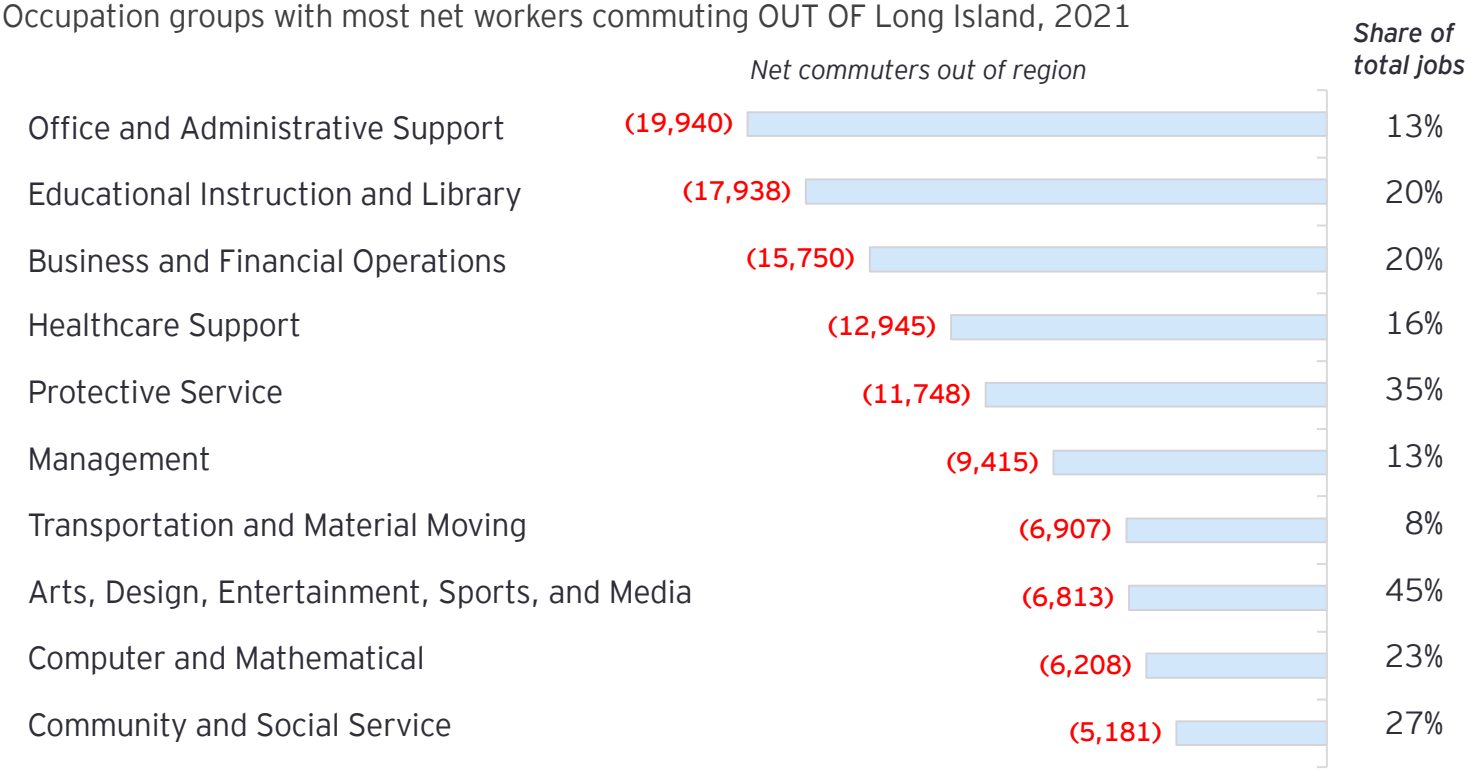


Source:
US Census Bureau

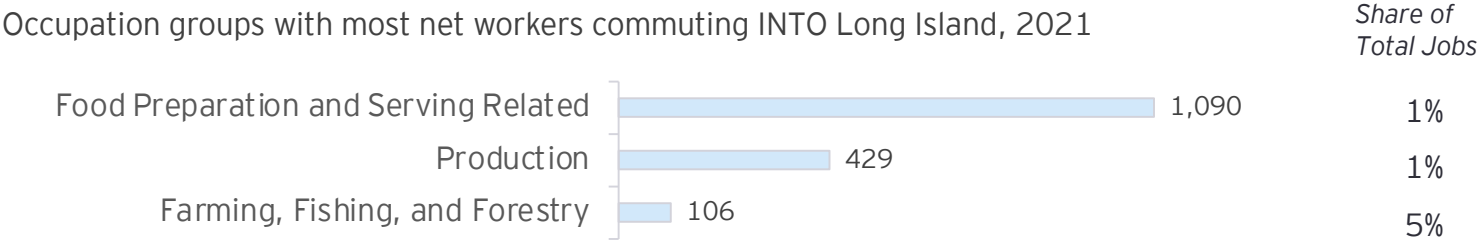
Target Sector: Advanced Manufacturing

Most Long Island residents that are employed outside the region (commuting or remote) are in Office Administration, Education, and Business. One-third of Protective Service workers commute out, and 45% of Arts workers commute out. Relatively small numbers commute it, with a focus on Food Prep and Production workers.

Occupation groups with most net workers commuting OUT OF Long Island, 2021



Occupation groups with most net workers commuting INTO Long Island, 2021

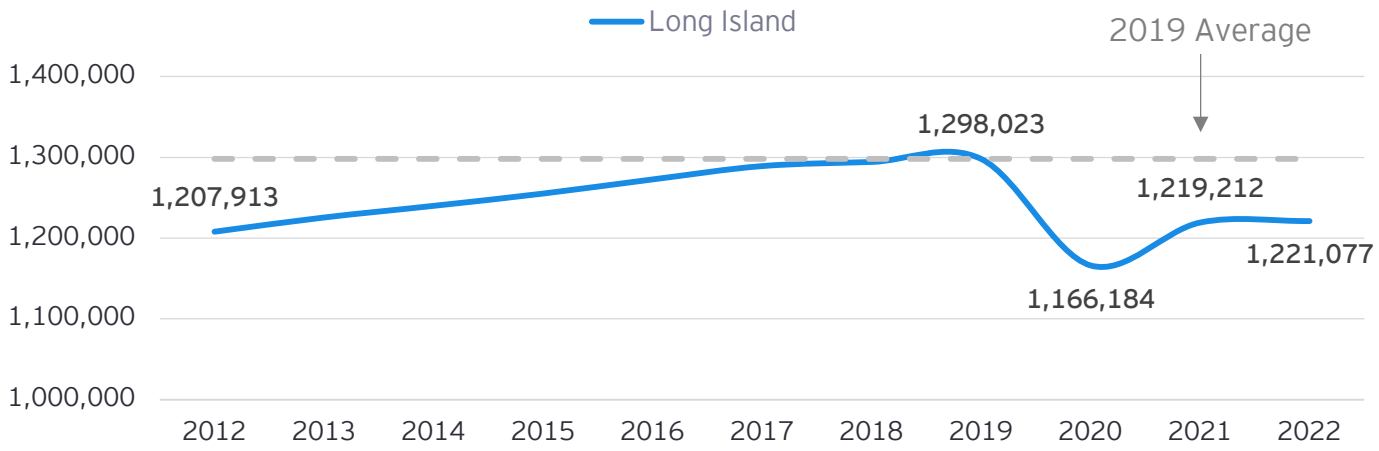


Source:
Lightcast

Workforce

Wage & Salary employment in Long Island has rebounded in the last two years but is still 6% lower than pre-pandemic levels.

Wage & Salary employment by year, 2012 – 2022

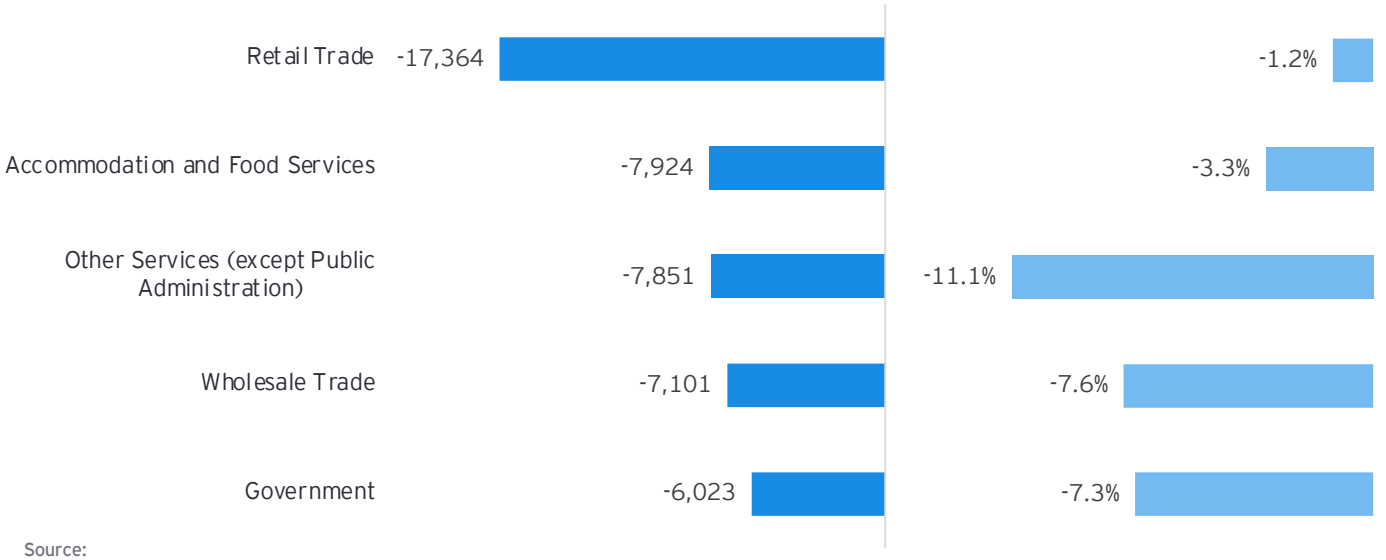


Source:
Lightcast

Between 2019 and 2022, the top five industries by net job loss saw a combined loss of more than 46,000 workers. Retail saw the largest declines in net job loss but the smallest decline in overall percentage job loss.

Top industries by net job loss, 2019 - 2022

% Change in jobs, 2019 - 2022



Source:
Lightcast

3 Advanced Manufacturing: Industry and occupational analysis

About this chapter

Building off the research started during Phase I, we examine overall trends for each of the target sectors identified for the Long Island region. We also examine the specific make-up of each target sector's workforce by age, sex, educational attainment, and explore sector wages compared to other industries.

The analysis can help understand the larger economic trends impacting the sector and help to inform sector-specific stakeholder engagement throughout the project. Key metrics in this chapter include:

- Industry employment by year
- Number of businesses by year
- Employment snapshot by NAICS
- Business snapshot by NAICS
- Average annual earnings
- Industry workforce by sex
- Industry workforce by age

Key findings

- Advanced Manufacturing employment in Long Island has experienced steady decline over the last ten years in Long Island. Still, 1,000 Advanced Manufacturing firms are present today.
- Pharmaceutical, Instruments, and Medical Equipment comprise about half of jobs in Advanced Manufacturing in Long Island. Aerospace and Machinery are top sectors as well.
- Long Island worker earnings in Advanced Manufacturing are much higher than average, and 40% of jobs require a Bachelor's or higher.
- Males and older workers are more likely to be employed in Advanced Manufacturing than the regional average.

Advanced Manufacturing

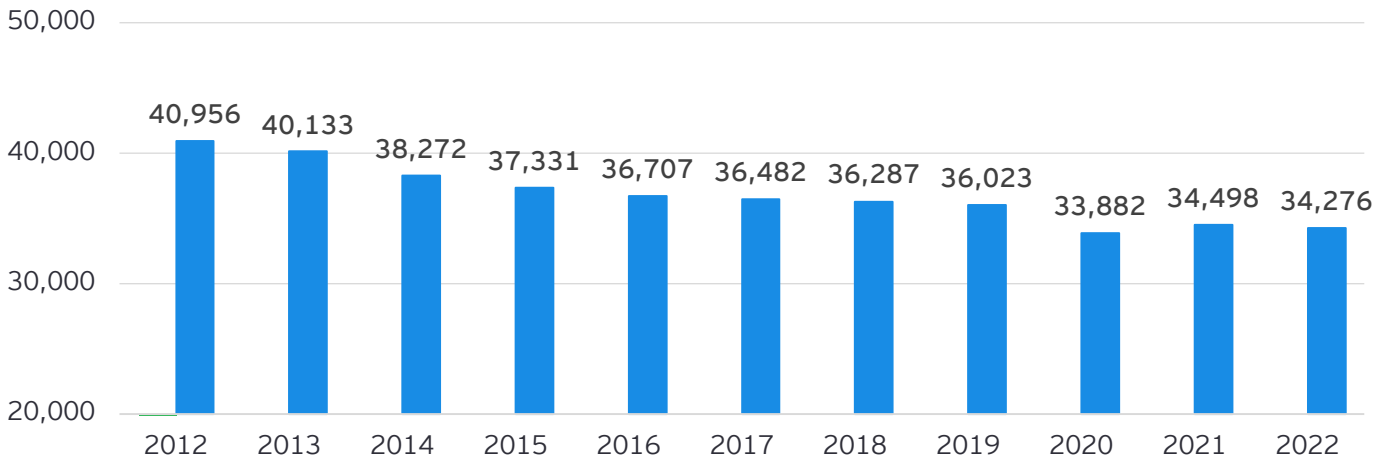
Cluster definitions for Advanced Manufacturing used as part of Phase II analysis for Long Island were provided to EY by the New York State Department of Labor and Empire State Development.

Advanced Manufacturing NAICS definition

NAICS Code	NAICS Description
3241	Petroleum and Coal Products Manufacturing
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
3254	Pharmaceutical and Medicine Manufacturing
3259	Other Chemical Product and Preparation Manufacturing
3271	Clay Product and Refractory Manufacturing
3279	Other Nonmetallic Mineral Product Manufacturing
3311	Iron and Steel Mills and Ferroalloy Manufacturing
3313	Alumina and Aluminum Production and Processing
3315	Foundries
3331	Agriculture, Construction, and Mining Machinery Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing
3339	Other General Purpose Machinery Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
3346	Manufacturing and Reproducing Magnetic and Optical Media
3351	Electric Lighting Equipment Manufacturing
3352	Household Appliance Manufacturing
3353	Electrical Equipment Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
3361	Motor Vehicle Manufacturing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3365	Railroad Rolling Stock Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
3391	Medical Equipment and Supplies Manufacturing
3399	Other Miscellaneous Manufacturing

Advanced Manufacturing employment has experienced steady decline over the last ten years in Long Island.

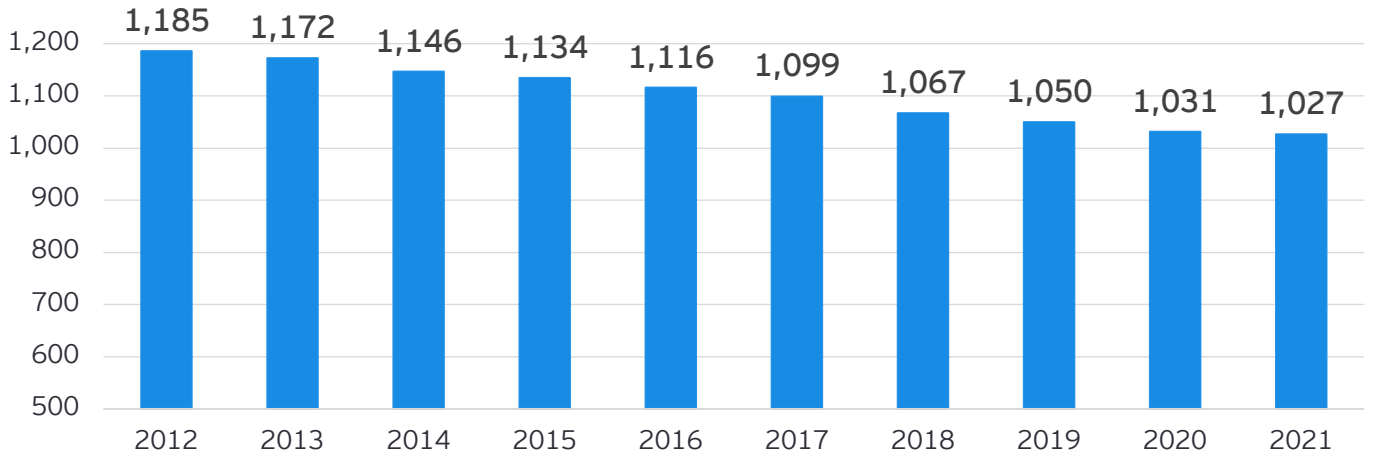
Advanced Manufacturing employment by year, 2012 – 2022



Source:
Lightcast

Despite the decline, over 1,000 Advanced Manufacturing businesses are found in Long Island today.

Number of payrolled business locations in Advanced Manufacturing, 2012 - 2021



Source: Lightcast

Pharmaceutical, Instruments, and Medical Equipment comprise about half of jobs in Advanced Manufacturing in Long Island. Aerospace and Machinery are top sectors as well.

Long Island Region Advanced Manufacturing jobs insights, 2016 - 2021

NAICS Code	NAICS Description	No. of Jobs (2021)	Growth in No. of Jobs (2016-2021)	% Growth in No. of Jobs (2016-2021)
3254	Pharmaceutical and Medicine Manuf.	11,544	1,748	17.8%
3345	Navigational, Measuring, Electromedical, and Control...	4,455	-445	-9.1%
3399	Other Miscellaneous Manuf.	3,356	-50	-1.5%
3344	Semiconductor and Other Electronic Component Manuf.	2,511	-871	-25.8%
3364	Aerospace Product and Parts Manuf.	2,235	-511	-18.6%
3391	Medical Equipment and Supplies Manuf.	1,615	-470	-22.6%
3339	Other General Purpose Machinery Manuf.	1,444	-222	-13.3%
3359	Other Electrical Equipment and Component Manuf.	1,330	69	5.4%
3342	Communications Equipment Manuf.	1,317	-557	-29.7%
3341	Computer and Peripheral Equipment Manuf.	700	-380	-35.2%
3279	Other Nonmetallic Mineral Product Manuf.	561	-20	-3.5%
3353	Electrical Equipment Manuf.	517	44	9.4%
3351	Electric Lighting Equipment Manuf.	498	-46	-8.5%
3332	Industrial Machinery Manuf.	452	-92	-16.9%
3333	Commercial and Service Industry Machinery Manuf.	423	-27	-6.1%
3336	Engine, Turbine, and Power Transmission Equipment Manuf.	292	-34	-10.4%
3363	Motor Vehicle Parts Manuf.	303	-151	-33.2%
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manuf.	235	130	125.2%
3343	Audio and Video Equipment Manuf.	180	-37	-17.2%
3241	Petroleum and Coal Products Manuf.	155	16	11.5%
3366	Ship and Boat Building	75	-14	-15.6%
3315	Foundries	71	-34	-32.3%
3259	Other Chemical Product and Preparation Manuf.	73	-101	-58.0%
3346	Manuf. and Reproducing Magnetic and Optical Media	49	1	1.4%
3271	Clay Product and Refractory Manuf.	23	-4	-15.2%
3362	Motor Vehicle Body and Trailer Manuf.	25	-11	-30.5%
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers...	23	12	113.1%
3352	Household Appliance Manuf.	22	-112	-83.4%
3331	Agriculture, Construction, and Mining Machinery Manuf.	13	-6	-32.0%
3311	Iron and Steel Mills and Ferroalloy Manuf.	0	0	NA
3313	Alumina and Aluminum Production and Processing	0	0	NA
3361	Motor Vehicle Manuf.	0	0	NA
3365	Railroad Rolling Stock Manuf.	0	0	NA
3369	Other Transportation Equipment Manuf.	0	-11	-100.0%
3251	Basic Chemical Manuf.	0	-21	-100.0%
	Total jobs	**34,498**	**-2,209**	**-6.0%**

Source: Lightcast

Chemical Product and Preparation Manufacturing accounts for more than 17% of total Advanced Manufacturing businesses within Long Island despite recent declines.

Long Island Region Advanced Manufacturing businesses insights, 2016 - 2021

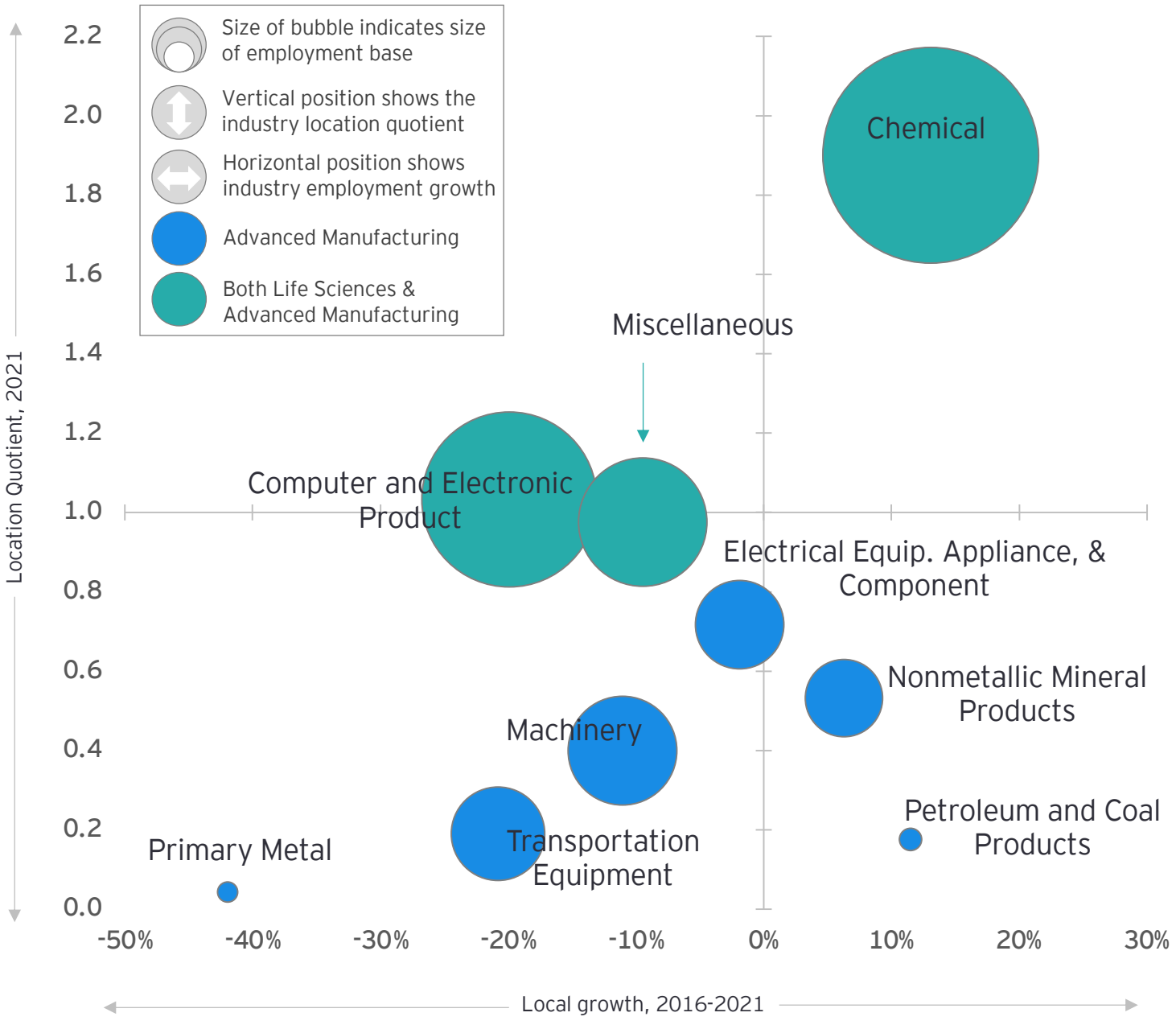
NAICS Code	NAICS Description	No. of Businesses (2021)	Growth in No. of Businesses (2016-2021)	% Growth in No. of Businesses (2016-2021)
3399	Other Chemical Product and Preparation Manuf.	178	-35	-16.4%
3391	Manuf. and Reproducing Magnetic and Optical Media	146	-18	-11.1%
3345	Ship and Boat Building	104	-8	-7.4%
3254	Audio and Video Equipment Manuf.	101	26	35.1%
3344	Engine, Turbine, and Power Transmission Equipment Manuf.	77	-8	-9.6%
3279	Computer and Peripheral Equipment Manuf.	49	8	18.8%
3339	Foundries	47	2	4.5%
3364	Pesticide, Fertilizer, and Other Agricultural Chemical Manuf.	44	-9	-17.4%
3342	Motor Vehicle Body and Trailer Manuf.	38	-5	-12.2%
3363	Other Transportation Equipment Manuf.	30	-7	-18.2%
3332	Clay Product and Refractory Manuf.	28	-5	-14.0%
3333	Iron and Steel Mills and Ferroalloy Manuf.	23	-2	-6.3%
3359	Basic Chemical Manuf.	22	-3	-11.0%
3351	Household Appliance Manuf.	21	-2	-7.7%
3353	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers...	20	-4	-15.8%
3241	Agriculture, Construction, and Mining Machinery Manuf.	12	-2	-14.3%
3259	Alumina and Aluminum Production and Processing	12	-6	-32.4%
3346	Motor Vehicle Manuf.	10	7	173.3%
3366	Railroad Rolling Stock Manuf.	10	-5	-32.2%
3343	Other Chemical Product and Preparation Manuf.	10	-1	-9.3%
3336	Manuf. and Reproducing Magnetic and Optical Media	9	-1	-10.0%
3341	Ship and Boat Building	9	-5	-35.7%
3315	Audio and Video Equipment Manuf.	6	-4	-38.5%
3253	Engine, Turbine, and Power Transmission Equipment Manuf.	5	2	66.7%
3362	Computer and Peripheral Equipment Manuf.	5	0	5.3%
3369	Foundries	3	-1	-25.0%
3271	Pesticide, Fertilizer, and Other Agricultural Chemical Manuf.	2	0	12.5%
3311	Motor Vehicle Body and Trailer Manuf.	2	1	100.0%
3251	Other Transportation Equipment Manuf.	2	-2	-50.0%
3352	Clay Product and Refractory Manuf.	1	-3	-68.7%
3252	Iron and Steel Mills and Ferroalloy Manuf.	1	-1	-50.0%
3331	Basic Chemical Manuf.	1	-1	-50.0%
3313	Household Appliance Manuf.	0	0	NA
3361	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers...	0	0	NA
3365	Agriculture, Construction, and Mining Machinery Manuf.	0	0	NA
	Total number of payrolled business locations	**1,027**	**-90**	**-8.0%**

Source: Lightcast

Advanced Manufacturing | Industry analysis

The fastest-growing Advanced Manufacturing subsector on Long Island is Chemical Manufacturing, which is also the most concentration (highest per capita jobs). Most other subsectors are declining.

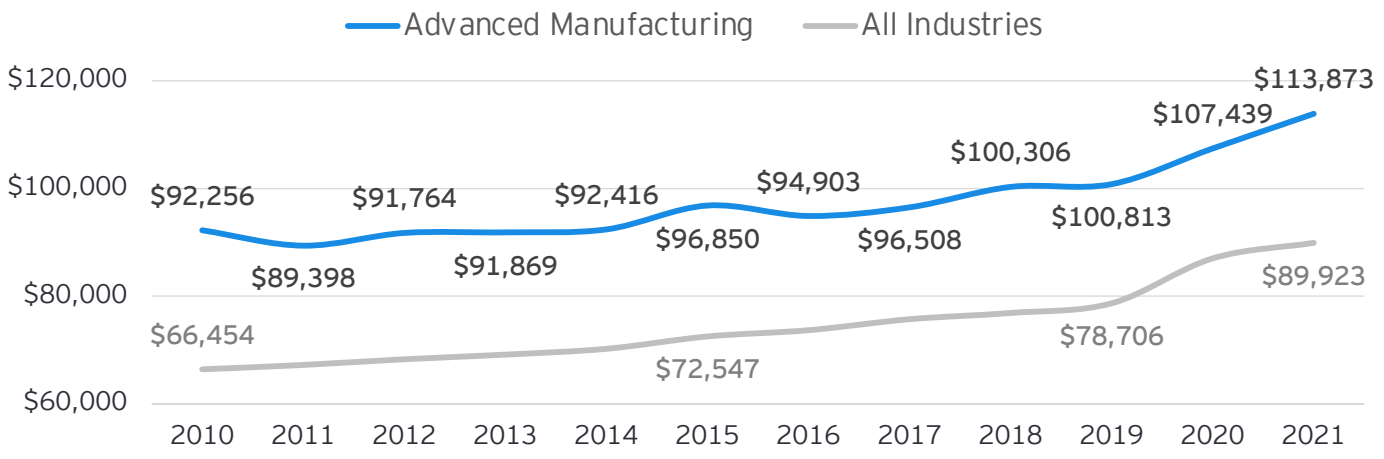
Priority sector performance by jobs, 3-Digit Level NAICS, 2016 and 2021



Source: Lightcast, Empire State Development cluster definitions

Long Island worker earnings in Advanced Manufacturing are nearly $114,000 and are much higher than the average of all industries.

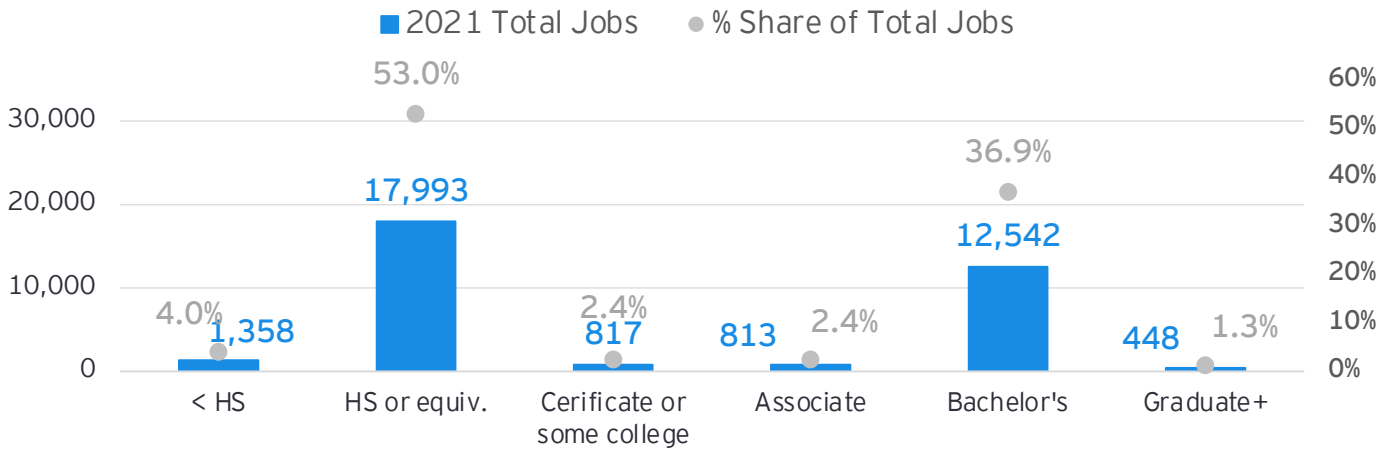
Average annual earnings, 2010 – 2021



Source:
Lightcast

Nearly 40% of all Advanced Manufacturing jobs on Long Island require a Bachelor's degree or higher. Over half of all jobs only require a high school education.

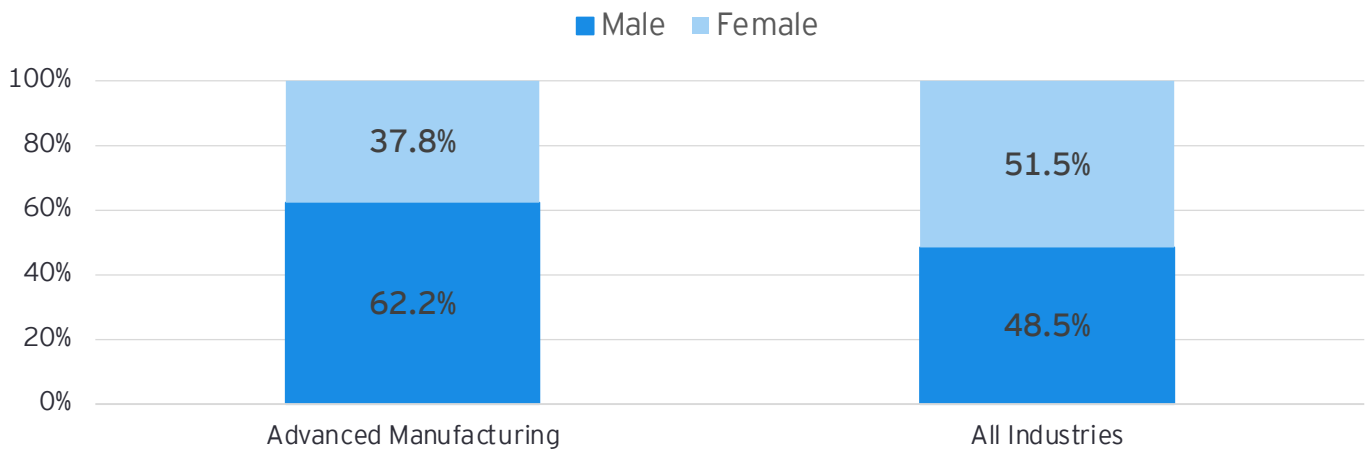
Total jobs by typical entry-level education requirement, Advanced Manufacturing, 2021



Source:
Lightcast

Male workers in Long Island account for nearly two-thirds of Advanced Manufacturing workers. Males account for slightly less than half of workers in all industries.

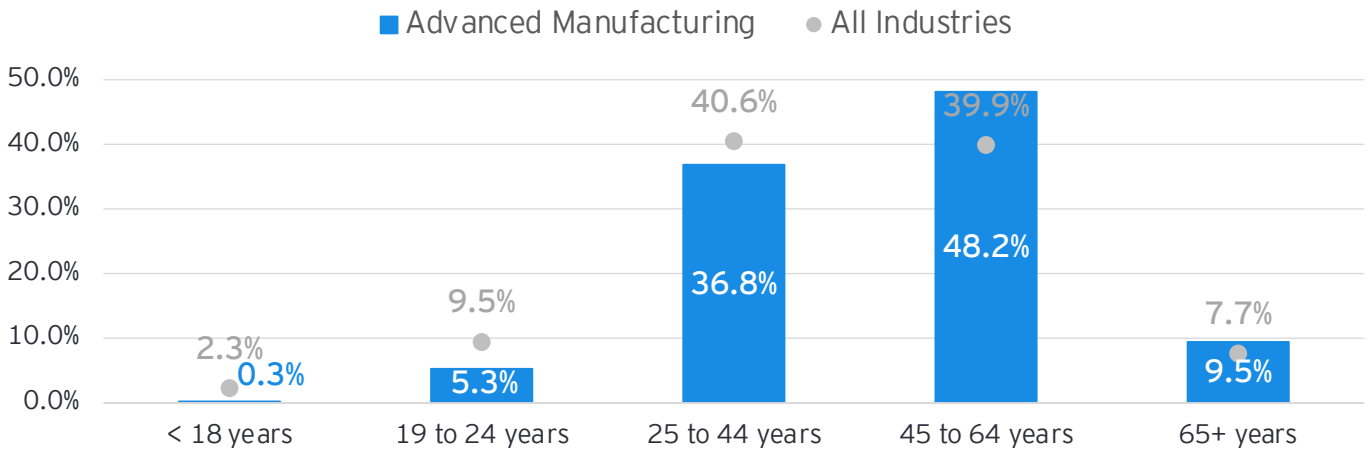
Employment within sector, by sex, 2021



Source:
Lightcast

Older workers (45+) comprise a much higher share of the Advanced Manufacturing workforce in Long Island, which could signal more retirements of workers in coming years.

Employment within sector, by age, 2021



Source:
Lightcast

A large number of Long Island workers in Advanced Manufacturing are in electrical assembly, packaging machine operators, miscellaneous assembly and clerks. Bachelor's level demand is concentrated in Operations Managers, Software Developers, and Engineers.

Top 25 Advanced Manufacturing occupations with entry-level educational requirements and median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-2028	Electrical, Electronic, and Electromechanical...	1,882	$18.73	HS diploma or equiv.
51-9111	Packaging and Filling Machine Operators and Tenders	1,647	$14.36	HS diploma or equiv.
51-2098	Miscellaneous Assemblers and Fabricators	1,347	$18.52	HS diploma or equiv.
43-5061	Production, Planning, and Expediting Clerks	1,291	$24.34	HS diploma or equiv.
11-1021	General and Operations Managers	1,009	$57.98	Bachelor's degree
15-1252	Software Developers	999	$58.25	Bachelor's degree
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	943	$20.95	HS diploma or equiv.
51-1011	First-Line Supervisors of Prod. and Operating Workers	863	$34.17	HS diploma or equiv.
51-9011	Chemical Equipment Operators and Tenders	800	$19.11	HS diploma or equiv.
41-4012	Sales Reps., Wholesale and Manufacturing, Except...	776	$32.24	HS diploma or equiv.
13-1028	Buyers and Purchasing Agents	602	$34.72	Bachelor's degree
17-2112	Industrial Engineers	593	$45.70	Bachelor's degree
49-9071	Maintenance and Repair Workers, General	586	$21.80	HS diploma or equiv.
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	560	$19.63	No formal education
13-2011	Accountants and Auditors	546	$44.69	Bachelor's degree
13-1082	Project Management Specialists	495	$45.23	Bachelor's degree
51-9081	Dental Laboratory Technicians	486	$26.98	HS diploma or equiv.
13-1161	Market Research Analysts and Marketing Specialists	469	$34.99	Bachelor's degree
19-2031	Chemists	454	$40.26	Bachelor's degree
17-2071	Electrical Engineers	444	$45.61	Bachelor's degree
51-4041	Machinists	426	$25.49	HS diploma or equiv.
43-6011	Exec. Secretaries and Exec. Administrative Assistants	425	$34.68	HS diploma or equiv.
43-4051	Customer Service Representatives	414	$19.16	HS diploma or equiv.
43-5071	Shipping, Receiving, and Inventory Clerks	392	$17.89	HS diploma or equiv.
41-4011	Sales Rep, Wholesale and Manufacturing, Technical...	391	$45.94	Bachelor's degree
	Total jobs in top 25 occupations	**18,843**	**$32.06**	

Source:
Lightcast

For those with a high school diploma or equivalent, most Long Island jobs in Advanced Manufacturing are in assembly, packaging, clerks, inspectors, equipment operators, and maintenance.

Top 25 Advanced Manufacturing occupations with entry-level educational requirements of high school diploma or less with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-2028	Electrical, Electronic, and Electromechanical...	1,882	$18.73	HS diploma or equiv.
51-9111	Packaging and Filling Machine Operators and Tenders	1,647	$14.36	HS diploma or equiv.
51-2098	Miscellaneous Assemblers and Fabricators	1,347	$18.52	HS diploma or equiv.
43-5061	Production, Planning, and Expediting Clerks	1,291	$24.34	HS diploma or equiv.
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	943	$20.95	HS diploma or equiv.
51-1011	First-Line Supervisors of Prod. and Operating Workers	863	$34.17	HS diploma or equiv.
51-9011	Chemical Equipment Operators and Tenders	800	$19.11	HS diploma or equiv.
41-4012	Sales Reps, Wholesale and Manufacturing, Except...	776	$32.24	HS diploma or equiv.
49-9071	Maintenance and Repair Workers, General	586	$21.80	HS diploma or equiv.
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	560	$19.63	No formal education
51-9081	Dental Laboratory Technicians	486	$26.98	HS diploma or equiv.
51-4041	Machinists	426	$25.49	HS diploma or equiv.
43-6011	Exec. Secretaries and Executive Admin. Assistants	425	$34.68	HS diploma or equiv.
43-4051	Customer Service Representatives	414	$19.16	HS diploma or equiv.
43-5071	Shipping, Receiving, and Inventory Clerks	392	$17.89	HS diploma or equiv.
51-9023	Mixing and Blending Machine Setters, Ops., and Tenders	368	$20.53	HS diploma or equiv.
43-9061	Office Clerks, General	311	$17.20	HS diploma or equiv.
43-6014	Secretaries and Admin. Assistants, Except Legal,...	301	$20.63	HS diploma or equiv.
49-9041	Industrial Machinery Mechanics	300	$30.23	HS diploma or equiv.
37-2011	Janitors and Cleaners, Except Maids & Housekeeping...	277	$16.82	No formal education
51-9161	Computer Numerically Controlled Tool Operators	259	$21.57	HS diploma or equiv.
43-1011	First-Line Supervisors of Office and Admin. Support...	240	$35.15	HS diploma or equiv.
51-9141	Semiconductor Processing Technicians	223	$20.93	HS diploma or equiv.
51-9041	Extruding, Forming, Pressing, and Compacting Mach...	216	$18.88	HS diploma or equiv.
51-4121	Welders, Cutters, Solderers, and Brazers	206	$26.48	HS diploma or equiv.
	Total jobs in top 25 occupations	**15,542**	**$23.06**	

Source: Lightcast

For positions requiring some college or an Associate's degree, most Long Island jobs in Advanced Manufacturing are for clerks, computer support, technicians, and drivers.

Top 25 Advanced Manufacturing occupations with mid-level educational requirements of certificate through associate degree with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
43-3031	Bookkeeping, Accounting, and Auditing Clerks	235	$21.42	Some college
17-3023	Electrical and Electronic Engineering Technologists...	185	$32.83	Associate degree
15-1232	Computer User Support Specialists	159	$27.45	Some college
19-4031	Chemical Technicians	147	$27.08	Associate degree
17-3026	Industrial Engineering Technologists and Technicians	132	$27.85	Associate degree
53-3032	Heavy and Tractor-Trailer Truck Drivers	119	$27.24	Postsec. Nondegree
19-4099	Life, Physical, and Social Science Technicians, All Other	84	$27.79	Associate degree
49-3011	Aircraft Mechanics and Service Technicians	77	$35.37	Postsec. Nondegree
51-4111	Tool and Die Makers	67	$26.25	Postsec. Nondegree
17-3013	Mechanical Drafters	63	$31.76	Associate degree
51-9162	Computer Numerically Controlled Tool Programmers	48	$31.18	Postsec. Nondegree
15-1231	Computer Network Support Specialists	46	$35.53	Associate degree
43-4151	Order Clerks	40	$16.50	Some college
17-3027	Mechanical Engineering Technologists and Technicians	39	$28.53	Associate degree
49-9021	Heating, Air Conditioning, & Refrigeration Mechanics...	39	$32.47	Postsec. Nondegree
17-3012	Electrical and Electronics Drafters	35	$36.83	Associate degree
43-4161	HR Assistants, Except Payroll and Timekeeping	29	$22.23	Associate degree
17-3029	Engineering Technologists and Technicians, Except...	25	$28.98	Associate degree
49-2094	Electrical and Electronics Repairers, Commercial & Ind...	23	$31.94	Postsec. Nondegree
17-3019	Drafters, All Other	14	$27.00	Associate degree
23-2011	Paralegals and Legal Assistants	14	$26.87	Associate degree
49-2011	Computer, Automated Teller, and Office Machine...	11	$24.31	Some college
49-2093	Electrical and Electronics Installers and Repairers,...	<10	$40.98	Postsec. Nondegree
29-2056	Veterinary Technologists and Technicians	<10	$21.37	Associate degree
33-2011	Firefighters	<10	$34.39	Postsec. Nondegree
	Total jobs in top 25 occupations	**1,631**	**$28.97**	

Source: Lightcast

For positions requiring a Bachelor's degree, most Long Island jobs in Advanced Manufacturing are for managers, software developers, buyers, industrial engineers, accountants, and analysts.

Top 25 Advanced Manufacturing occupations with high-level educational requirements of bachelor's and above with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
11-1021	General and Operations Managers	1,009	$57.98	Bachelor's degree
15-1252	Software Developers	999	$58.25	Bachelor's degree
13-1028	Buyers and Purchasing Agents	602	$34.72	Bachelor's degree
17-2112	Industrial Engineers	593	$45.70	Bachelor's degree
13-2011	Accountants and Auditors	546	$44.69	Bachelor's degree
13-1082	Project Management Specialists	495	$45.23	Bachelor's degree
13-1161	Market Research Analysts and Marketing Specialists	469	$34.99	Bachelor's degree
19-2031	Chemists	454	$40.26	Bachelor's degree
17-2071	Electrical Engineers	444	$45.61	Bachelor's degree
41-4011	Sales Reps., Wholesale and Manuf., Technical and...	391	$45.94	Bachelor's degree
11-2022	Sales Managers	303	$86.89	Bachelor's degree
11-2021	Marketing Managers	296	$74.42	Bachelor's degree
11-3031	Financial Managers	295	$94.09	Bachelor's degree
13-2051	Financial and Investment Analysts	289	$51.63	Bachelor's degree
17-2141	Mechanical Engineers	285	$45.29	Bachelor's degree
11-3021	Computer and Information Systems Managers	278	$89.10	Bachelor's degree
11-9041	Architectural and Engineering Managers	273	$73.63	Bachelor's degree
13-1071	Human Resources Specialists	267	$35.60	Bachelor's degree
11-3051	Industrial Production Managers	255	$57.90	Bachelor's degree
13-1041	Compliance Officers	234	$38.42	Bachelor's degree
13-1111	Management Analysts	221	$45.47	Bachelor's degree
19-4021	Biological Technicians	209	$25.03	Bachelor's degree
19-1042	Medical Scientists, Except Epidemiologists	200	$40.62	Ph.D
27-1024	Graphic Designers	190	$30.47	Bachelor's degree
15-1211	Computer Systems Analysts	170	$46.91	Bachelor's degree
	Total jobs in top 25 occupations	**9,769**	**$51.55**	

Source:
Lightcast

Advanced Manufacturing | Workforce Gap Analysis

Advanced Manufacturing firms, as shown in tables in the previous pages, require diverse occupations and skill levels to fill jobs in their facilities. The gap analysis below shows that Long Island does not produce (accredited) Certificate-level graduates in Advanced Manufacturing and overproduces Bachelor's graduates, who are likely to leave the region or commute out for jobs.

The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

Certificate-level positions are significantly underserved by local accredited education programs, which may suggest manufacturers are reliant on for-profit educators or on-the-job training. At the Associate's level, **Chemical Technicians** are not produced in the region, but **Electrical/Electronic Technicians** have large numbers of graduates.

Supply-Demand Gap Conditions
Advanced Manufacturing, Long Island

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US
	Electrical & Electronics Repairers	Certificate	194	0	0%	0%
	General Machinist	Certificate	174	0	0%	0%
	Industrial Production Technicians	Certificate	206	0	0%	0%
	Industrial Machinery Maintenance	Certificate	181	0	0%	0%
	Precision Equipment Repair	Certificate	1,418	0	0%	0%
	Welders	Certificate	141	0	0%	0%
	Chemical Technicians	Associate's	42	0	0%	0%
	Electrical / Electronics Technicians & Di	Associate's	72	193	268%	991%
	Industrial Engineering Technicians	Associate's	33	2	6%	6%
	Accountants & Tax Examiners	Bachelor's	1,294	473	37%	75%
	Operations Research Analysts	Bachelor's	45	0	0%	0%
	Chemists	Bachelor's	87	129	149%	66%
	Electrical and Electronics Engineers	Bachelor's	108	288	268%	213%
	Engineering Managers	Bachelor's	59	100	169%	325%
	Industrial Engineers	Bachelor's	81	67	83%	113%
	Mechanical Engineers	Bachelor's	78	451	580%	340%
	Computer Systems & Information Secu	Bachelor's	477	491	103%	114%
	Supply Chain Managers & Analysts	Bachelor's	77	2	3%	7%

Lg Shortage | Shortage | In-Balance | Over-Supply | Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

Advanced Manufacturing | Workforce Gap Analysis

At the Bachelor's level, programs in **Accounting** and **Chemistry** underproduce graduates to meet job demand, and no programs are available in **Operations Research**. **Engineering** and **IT** programs appear to be either in-balance with local job demand or over-supplied. Long Island's unique position as a home for commuters may suggest that graduates may also plan to commute or relocate out for jobs. Manufacturers may also rely on attracting new Bachelor's hires to relocate or commute in.

More on the Methodology

"Job openings" in 2021 is used to determine demand, which is a combination of workforce turnover and retirement as well as net new jobs. Regional job openings are compared to regional graduate output using an SOC-CIP taxonomy that accounts for education levels. (For example, a Bachelor's in Psychology is not matched with a Psychologist occupation because a Master's or PhD is required.)

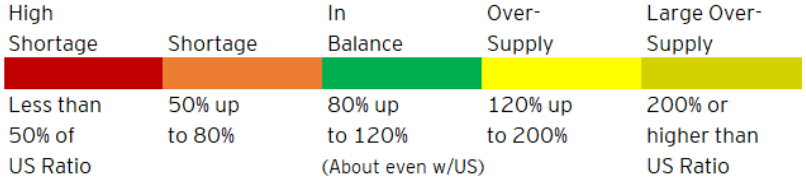
Furthermore, the "supply-demand gap" doesn't hold true as a 1:1 ratio for all occupations. Therefore, we compare the regional ratio to the US ratio to determine if regional graduate output is relatively high or low. This Regional-to-US ratio also compensates for "non-accredited" programs that may exist but aren't in the data (e.g. for-profits that aren't required to report their enrollment data to the government). For example, non-profits may train Home Health Aides which aren't in the data, but the regional comparison of "accredited" graduates to the US does help inform if a local gap may exist.

We determine the regional gap or oversupply in the right column ("ratio vs. US"). If regional graduate output is less than 50% of the US ratio, then we determine there is a large shortage and color the first "Gap" column a dark red. See the legend for colors and their ranges below.

Why does graduate output not always match job openings evenly? Graduates sometimes choose other occupations: Welding may need more graduates since many may finish the program and then choose other jobs, or an Electrical Engineering graduate with a minor in Business may choose a sales but not engineering job. Some positions, like Executive Secretaries or Logistics Clerks are helped by Certificates but many workers learn their skill on the job.

Data is sourced from US Dept. of Education's IPEDS programs (graduate output) and Lightcast/EMSI (job openings by occupation by county). We use a custom taxonomy allocates 1,000 occupation codes and 10,000 graduate program codes (CIP+AwardLevel combinations) into 310 occupation groups. Some degree programs aren't matched if they don't align with jobs in the SOC system or if more education is needed to enter the occupation.

Gap Legend and Ratio Ranges:



4 Life Science & Biotech: Industry and occupational analysis

About this chapter

Building off the research started during Phase I, we examine overall trends for each of the target sectors identified for the Long Island region. We also examine the specific make-up of each target sector's workforce by age, sex, educational attainment, and explore sector wages compared to other industries.

The analysis can help explain the larger economic trends impacting the sector and help to inform sector-specific stakeholder engagement throughout the project. Key metrics in this chapter include:

- Industry employment by year
- Number of businesses by year
- Employment snapshot by NAICS
- Business snapshot by NAICS
- Average annual earnings
- Industry workforce by sex
- Industry workforce by age

Key findings

- The Life Science & Biotech sector employs nearly 20,000 workers in Long Island, with half in Pharmaceutical manufacturing.
- Sector employment in Long Island has been growing consistently, except for a small dip in 2020.
- The sector workforce is split evenly between males and females, as well as younger and older workers.
- Nearly 40% of workers in Life Science & Biotech are in jobs requiring a Bachelor's degree or higher. Still, half of jobs require a high school diploma or less.

Life Science & Biotech

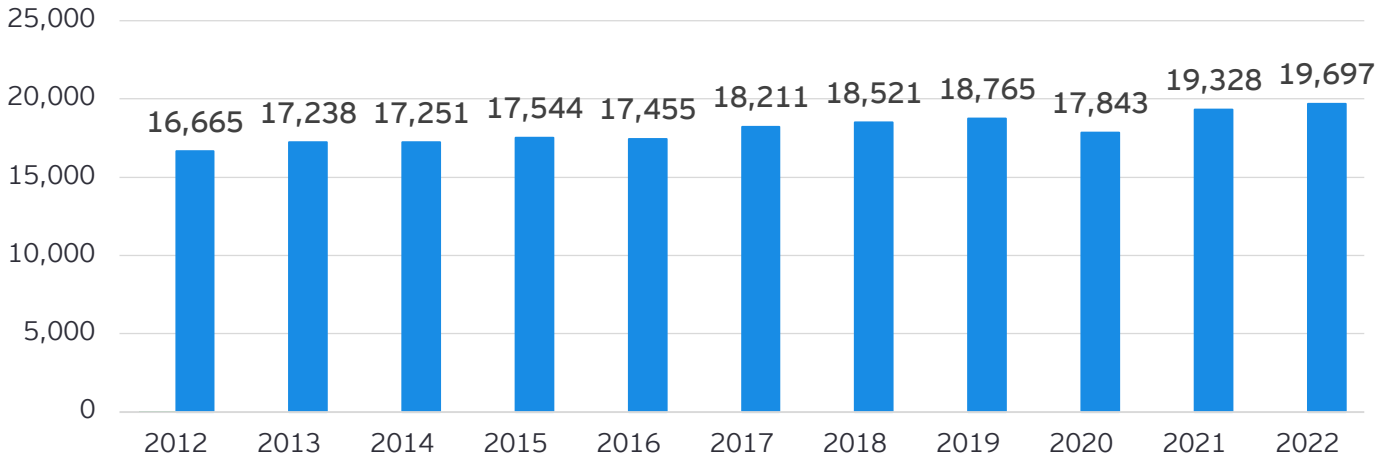
Cluster definitions for the Life Science & Biotech sector used as part of Phase II analysis for Long Island were provided to EY by New York State Department of Labor and Empire State Development.

Life Science & Biotech NAICS definition

NAICS Code	NAICS Description
325411	Medicinal and Botanical Manufacturing
325412	Pharmaceutical Preparation Manufacturing
325413	In-Vitro Diagnostic Substance Manufacturing
325414	Biological Product (except Diagnostic) Manufacturing
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing
334517	Irradiation Apparatus Manufacturing
339112	Surgical and Medical Instrument Manufacturing
339113	Surgical Appliance and Supplies Manufacturing
339114	Dental Equipment and Supplies Manufacturing
339115	Ophthalmic Goods Manufacturing
339116	Dental Laboratories
541714	Research and Development in Biotechnology (except Nanobiotechnology)
621511	Medical Laboratories
621512	Diagnostic Imaging Centers

The number of Long Island employees in Life Science & Biotech has steadily been growing and is nearing 20,000 workers.

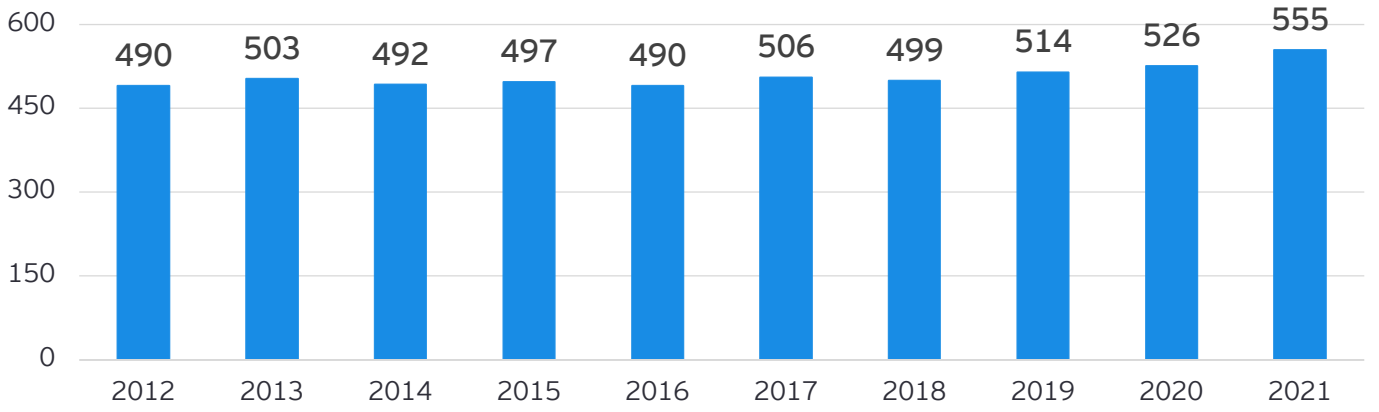
Life Science & Biotech employment by year, 2012 – 2022



Source:
Lightcast

The number of Life Science & Biotech business locations in Long Island has grown since 2018 and is nearing 600 locations.

Number of payrolled business locations in Life Science & Biotech, 2012 - 2021

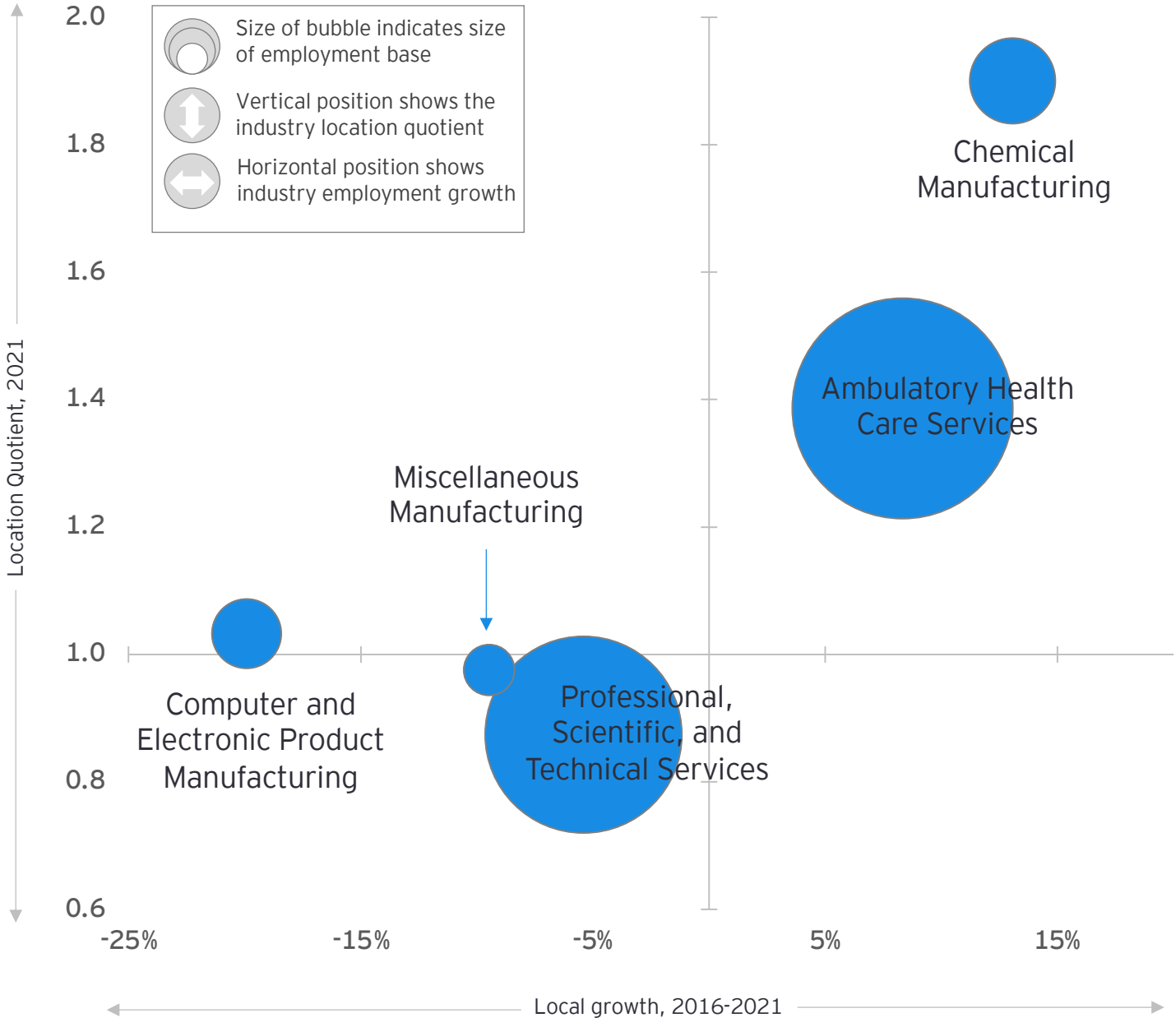


Source: Lightcast

Life Science & Biotech | Industry Analysis

The fastest-growing Life Science & Biotech subsector in Long Island is Chemical Manufacturing (including Pharma), which is also the most concentrated (highest per capita jobs). Ambulatory health care services is a large and growing subsector that supports the sector (though not included the target sector definition). Most other subsectors are declining.

Priority sector performance by jobs, 3-Digit Level NAICS, 2016 and 2021



Source: Lightcast, Empire State Development cluster definitions

Long Island has nearly 90 Pharmaceutical Manufacturing companies. Laboratories are also numerous but typically support testing from Health Care facilities. About 50 companies perform R&D (typically drug design) and another 70+ companies manufacture instruments and supplies.

Long Island Region Life Science & Biotech businesses insights, 2016 - 2021

NAICS Code	NAICS Description	No. of Businesses (2021)	Growth in No. of Businesses (2016-2021)	% Growth in No. of Businesses (2016-2021)
621511	Medical Laboratories	146	20	15.4%
325412	Pharmaceutical Preparation Manufacturing	87	25	40.9%
621512	Diagnostic Imaging Centers	85	16	23.2%
339116	Dental Laboratories	77	-11	-12.8%
541714	R&D in Biotechnology (except Nanobiotechnology)	51	20	64.6%
339113	Surgical Appliance and Supplies Manufacturing	37	-3	-6.4%
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	20	-1	-5.9%
339112	Surgical and Medical Instrument Manufacturing	17	2	15.8%
339114	Dental Equipment and Supplies Manufacturing	13	-2	-13.3%
325411	Medicinal and Botanical Manufacturing	9	-1	-5.6%
334517	Irradiation Apparatus Manufacturing	6	2	50.0%
325413	In-Vitro Diagnostic Substance Manufacturing	4	2	100.0%
339115	Ophthalmic Goods Manufacturing	3	-5	-59.4%
325414	Biological Product (except Diagnostic) Manufacturing	2	-1	-25.0%
	Total number of payrolled business locations	**555**	**64**	**13.1%**

Source:
Lightcast

Nearly 20,000 Life Science & Biotech jobs are in Long Island. Pharmaceutical Preparation and Medical Laboratories comprise about half of jobs. R&D in Biotechnology and Diagnostic Substance are top sectors as well.

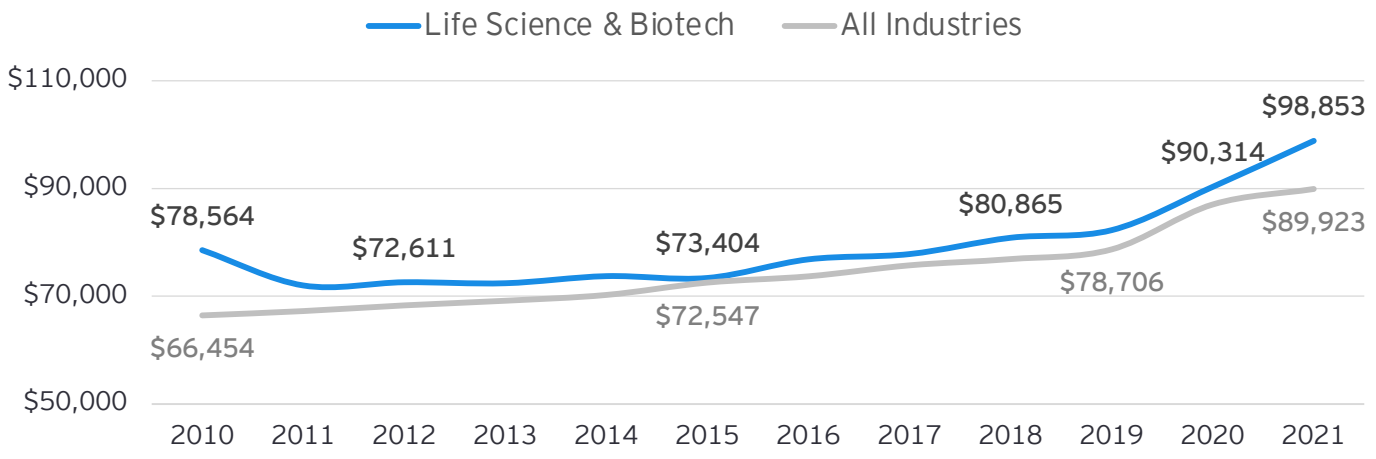
Long Island Region Life Science & Biotech jobs insights, 2016 - 2021

NAICS Code	NAICS Description	No. of Jobs (2021)	Growth in No. of Jobs (2016-2021)	% Growth in No. of Jobs (2016-2021)
325412	Pharmaceutical Preparation Manufacturing	10,851	1,580	17.0%
621511	Medical Laboratories	3,917	582	17.5%
541714	R&D in Biotechnology (except Nanobiotechnology)	992	-72	-6.7%
621512	Diagnostic Imaging Centers	766	121	18.7%
339113	Surgical Appliance and Supplies Manufacturing	703	-61	-7.9%
339116	Dental Laboratories	441	-102	-18.7%
325414	Biological Product (except Diagnostic) Manufacturing	334	37	12.4%
325413	In-Vitro Diagnostic Substance Manufacturing	262	246	1577.8%
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	270	-143	-34.6%
339114	Dental Equipment and Supplies Manufacturing	259	-113	-30.3%
334517	Irradiation Apparatus Manufacturing	224	107	90.7%
339112	Surgical and Medical Instrument Manufacturing	148	-39	-20.9%
325411	Medicinal and Botanical Manufacturing	98	-114	-53.9%
339115	Ophthalmic Goods Manufacturing	64	-156	-70.9%
	Total jobs	**19,328**	**1,873**	**10.7%**

Source:
Lightcast

Long Island worker earnings in Life Science & Biotech are $98,853 and somewhat higher than average of all industries.

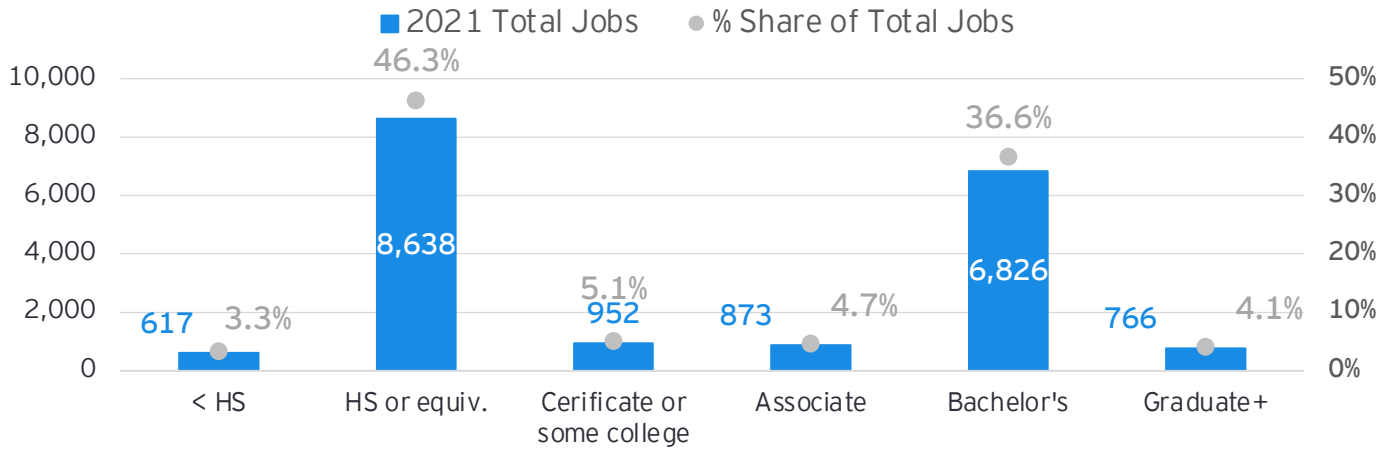
Average annual earnings, 2010 - 2021



Source:
Lightcast

Nearly 40% of workers in Life Science & Biotech are in jobs requiring a Bachelor's degree or higher. Still, half of jobs require a high school diploma or less.

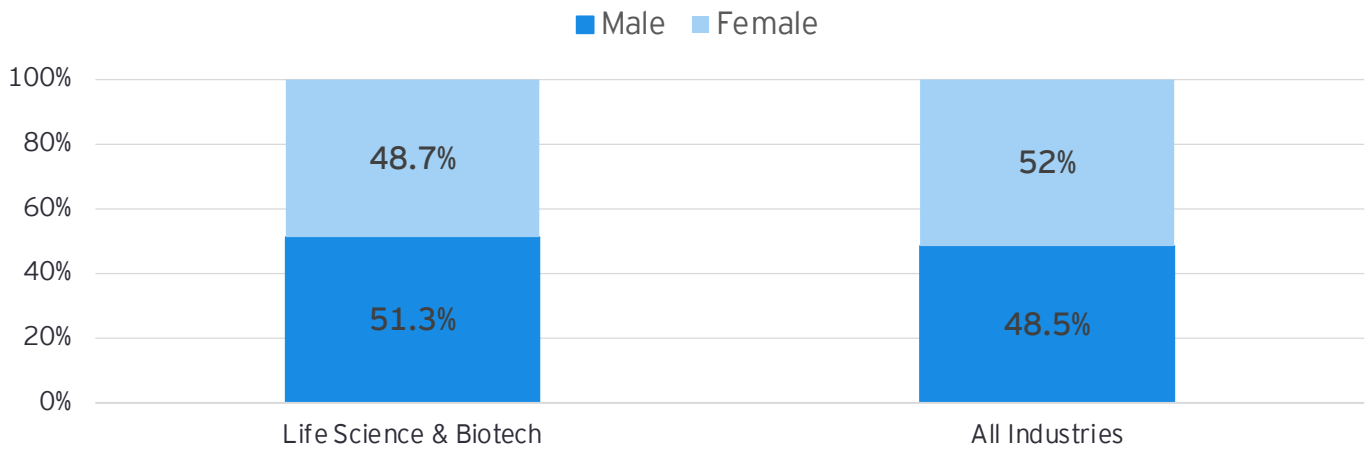
Total jobs by typical education requirement, Bio Life Sciences, 2021



Source:
Lightcast

Long Island's gender split within Life Science & Biotech mirrors the overall workforce, with just a slightly higher share of male employment.

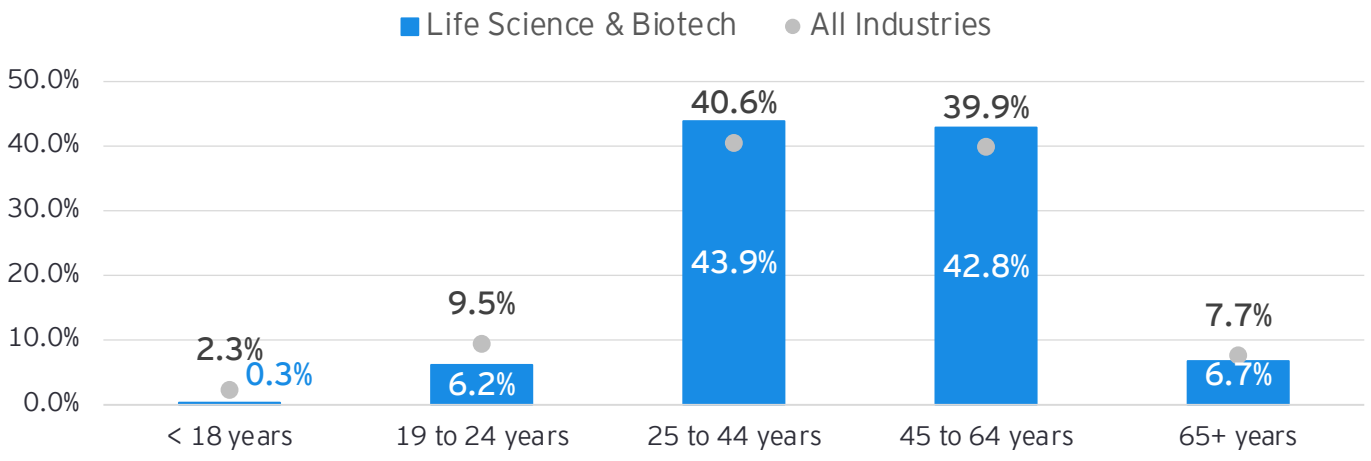
Employment within sector, by sex, 2021



Source:
Lightcast

Most Life Science & Biotech workers in Long Island are in the 25-64 age range, a slightly higher share than seen across all industries.

Employment within sector, by age, 2021



Source:
Lightcast

Life Science & Biotech | Occupational Analysis

Occupations in Life Science & Biotech are diverse across education levels, with machine operators leading high school-level jobs and laboratory technicians, operations managers and chemists leading bachelor's level jobs.

Top 25 Life Science & Biotech occupations with entry-level educational requirements and median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-9111	Packaging and Filling Machine Operators and Tenders	1,556	$14.36	HS diploma or equiv.
29-2018	Clinical Laboratory Technologists and Technicians	980	$37.17	Bachelor's degree
51-9011	Chemical Equipment Operators and Tenders	742	$19.11	HS diploma or equiv.
31-9097	Phlebotomists	595	$23.26	Postsec. Nondegree
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	528	$20.95	HS diploma or equiv.
11-1021	General and Operations Managers	492	$57.98	Bachelor's degree
43-5061	Production, Planning, and Expediting Clerks	490	$24.34	HS diploma or equiv.
51-9081	Dental Laboratory Technicians	489	$26.98	HS diploma or equiv.
19-2031	Chemists	451	$40.26	Bachelor's degree
51-1011	First-Line Supervisors of Prod. and Operating Workers	405	$34.17	HS diploma or equiv.
43-4051	Customer Service Representatives	365	$19.16	HS diploma or equiv.
19-1042	Medical Scientists, Except Epidemiologists	341	$40.62	Graduate +
51-9023	Mixing & Blending Machine Setters, Op., and Tenders	314	$20.53	HS diploma or equiv.
49-9071	Maintenance and Repair Workers, General	304	$21.80	HS diploma or equiv.
43-5021	Couriers and Messengers	296	$17.44	HS diploma or equiv.
29-2034	Radiologic Technologists and Technicians	269	$38.78	Associate degree
19-4021	Biological Technicians	261	$25.03	Bachelor's degree
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	246	$19.63	No formal education
43-6011	Exec. Secretaries and Executive Admin. Assistants	242	$34.68	HS diploma or equiv.
13-2011	Accountants and Auditors	236	$44.69	Bachelor's degree
13-1161	Market Research Analysts and Marketing Specialists	233	$34.99	Bachelor's degree
17-2112	Industrial Engineers	229	$45.70	Bachelor's degree
13-1082	Project Management Specialists	219	$45.23	Bachelor's degree
41-4011	Sales Reps. Wholesale & Man. Tech. & Scientific Prod.	217	$45.94	Bachelor's degree
13-1041	Compliance Officers	206	$38.42	Bachelor's degree
	Total jobs in top 25 occupations	**10,706**	**$31.65**	

Source:
Lightcast

For positions requiring a high school diploma or equivalent, most jobs in Life Science & Biotech are for machine operators, inspectors and clerks, production supervisors, and customer service.

Top 25 Life Science & Biotech occupations with entry-level educational requirements of high school diploma or less with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-9111	Packaging and Filling Machine Operators and Tenders	1,556	$14.36	HS diploma or equiv.
51-9011	Chemical Equipment Operators and Tenders	742	$19.11	HS diploma or equiv.
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	528	$20.95	HS diploma or equiv.
43-5061	Production, Planning, and Expediting Clerks	490	$24.34	HS diploma or equiv.
51-9081	Dental Laboratory Technicians	489	$26.98	HS diploma or equiv.
51-1011	First-Line Supervisors of Production and Operating Workers	405	$34.17	HS diploma or equiv.
43-4051	Customer Service Representatives	365	$19.16	HS diploma or equiv.
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	314	$20.53	HS diploma or equiv.
49-9071	Maintenance and Repair Workers, General	304	$21.80	HS diploma or equiv.
43-5021	Couriers and Messengers	296	$17.44	HS diploma or equiv.
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	246	$19.63	No formal education
43-6011	Exec. Secretaries and Executive Administrative Assistants	242	$34.68	HS diploma or equiv.
37-2011	Janitors & Cleaners, Except Maids and Housekeeping Cleaners	183	$16.82	No formal education
51-2098	Miscellaneous Assemblers and Fabricators	181	$18.52	HS diploma or equiv.
41-4012	Sales Reps., Wholesale & Man., Except Tech. & Scientific Prod.	179	$32.24	HS diploma or equiv.
43-1011	First-Line Supervisors of Office & Admin. Support Workers	174	$35.15	HS diploma or equiv.
43-6014	Secretaries & Admin. Assistants, Except Legal, Medical, & Ex.	171	$20.63	HS diploma or equiv.
49-9041	Industrial Machinery Mechanics	168	$30.23	HS diploma or equiv.
43-6013	Medical Secretaries and Administrative Assistants	160	$21.49	HS diploma or equiv.
43-5071	Shipping, Receiving, and Inventory Clerks	156	$17.89	HS diploma or equiv.
43-9061	Office Clerks, General	150	$17.20	HS diploma or equiv.
41-3091	Sales Reps. of Services, Except Advertising, Insurance...	135	$31.96	HS diploma or equiv.
51-9041	Extruding, Forming, Pressing, and Compacting Machine...	133	$18.88	HS diploma or equiv.
43-4171	Receptionists and Information Clerks	110	$16.81	HS diploma or equiv.
43-3021	Billing and Posting Clerks	88	$21.06	HS diploma or equiv.
	Total jobs in top 25 occupations	**7,966**	**$22.88**	

Source:
Lightcast

For Certificate or Associate's level positions, most jobs in Life Science & Bio are for phlebotomists, rad tech, and sonographers (working in diagnostic labs). Manufacturing locations need technicians of various skill sets (chemical, industrial).

Top 25 Life Science & Biotech occupations with mid-level educational requirements of certificate through associate degree with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
31-9097	Phlebotomists	595	$23.26	Postsec. Nondegree
29-2034	Radiologic Technologists and Technicians	269	$38.78	Associate degree
29-2032	Diagnostic Medical Sonographers	147	$42.22	Associate degree
19-4031	Chemical Technicians	136	$27.08	Associate degree
43-3031	Bookkeeping, Accounting, and Auditing Clerks	108	$21.42	#N/A
19-4099	Life, Physical, and Social Science Technicians, All Other	104	$27.79	Associate degree
29-2035	Magnetic Resonance Imaging Technologists	97	$42.68	Associate degree
15-1232	Computer User Support Specialists	77	$27.45	#N/A
17-3026	Industrial Engineering Technologists and Technicians	54	$27.85	Associate degree
29-2099	Health Technologists and Technicians, All Other	46	$25.23	Postsec. Nondegree
31-9092	Medical Assistants	44	$18.41	Postsec. Nondegree
15-1231	Computer Network Support Specialists	25	$35.53	Associate degree
31-9094	Medical Transcriptionists	25	$13.69	Postsec. Nondegree
17-3023	Electrical and Electronic Engineering Techs…	25	$32.83	Associate degree
43-4151	Order Clerks	17	$16.50	Some college
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	16	$22.23	Associate degree
29-2072	Medical Records Specialists	16	$25.06	Postsec. Nondegree
49-9021	Heating, Air Conditioning, and Refrigeration Mech. & Installers	14	$32.47	Postsec. Nondegree
53-3032	Heavy and Tractor-Trailer Truck Drivers	12	$27.24	Postsec. Nondegree
51-4111	Tool and Die Makers	<10	$26.25	Postsec. Nondegree
29-2031	Cardiovascular Technologists and Technicians	<10	$35.49	Associate degree
29-2033	Nuclear Medicine Technologists	<10	$45.76	Associate degree
29-2036	Medical Dosimetrists	<10	$59.83	Postsec. Nondegree
29-2042	Emergency Medical Technicians	<10	$18.19	Postsec. Nondegree
29-2043	Paramedics	<10	$28.08	Postsec. Nondegree
	Total jobs in top 25 occupations	**1,825**	**$29.65**	

Source:
Lightcast

Life Science & Biotech | Occupational Analysis

For positions requiring a bachelor's or most advance degree, most jobs in Life Science & Biotech are for technologists, operations managers, chemists and medical scientists, and biotechnicians.

Top 25 Life Science & Biotech occupations with high-level educational requirements of bachelor's and above with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
29-2018	Clinical Laboratory Technologists and Technicians	980	$37.17	Bachelor's degree
11-1021	General and Operations Managers	492	$57.98	Bachelor's degree
19-2031	Chemists	451	$40.26	Bachelor's degree
19-1042	Medical Scientists, Except Epidemiologists	341	$40.62	Doctoral
19-4021	Biological Technicians	261	$25.03	Bachelor's degree
13-2011	Accountants and Auditors	236	$44.69	Bachelor's degree
13-1161	Market Research Analysts and Marketing Specialists	233	$34.99	Bachelor's degree
17-2112	Industrial Engineers	229	$45.70	Bachelor's degree
13-1082	Project Management Specialists	219	$45.23	Bachelor's degree
41-4011	Sales Reps., Wholesale and Man., Technical & Scientific Prod.	217	$45.94	Bachelor's degree
13-1041	Compliance Officers	206	$38.42	Bachelor's degree
15-1252	Software Developers	205	$58.25	Bachelor's degree
13-1028	Buyers and Purchasing Agents	183	$34.72	Bachelor's degree
11-9121	Natural Sciences Managers	153	$69.73	Bachelor's degree
11-3031	Financial Managers	141	$94.09	Bachelor's degree
13-1071	Human Resources Specialists	137	$35.60	Bachelor's degree
11-2021	Marketing Managers	136	$74.42	Bachelor's degree
11-3051	Industrial Production Managers	130	$57.90	Bachelor's degree
19-1021	Biochemists and Biophysicists	129	$41.80	Doctoral
11-3021	Computer and Information Systems Managers	126	$89.10	Bachelor's degree
11-2022	Sales Managers	113	$86.89	Bachelor's degree
13-1111	Management Analysts	105	$45.47	Bachelor's degree
11-9111	Medical and Health Services Managers	104	$66.80	Bachelor's degree
13-1151	Training and Development Specialists	103	$31.08	Bachelor's degree
19-1029	Biological Scientists, All Other	103	$43.64	Bachelor's degree
	Total jobs in top 25 occupations	**5,735**	**$51.42**	

Source:
Lightcast

Life Science & Biotech | Workforce Gap Analysis

Life Science & Biotech firms, as shown in tables in the previous pages, require diverse occupations and skill levels to fill jobs in their facilities. The gap analysis below shows that Long Island does not produce enough graduates for Associate's-level positions, but Bachelor's graduates are sufficient to meet demand (which may be affected by their plans to commute or relocate).

The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

Supply-Demand Gap Conditions
Life Science & Biotech, Long Island

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US
	Medical Secretaries	High School	1,030	215	21%	108%
	Medical Equipment Specialists	Certificate	248	202	81%	247%
	Medical Records and Health Informatio	Certificate	127	265	209%	104%
	Industrial Machinery Maintenance	Certificate	181	0	0%	0%
	Chemical Technicians	Associate's	42	0	0%	0%
	Science Technicians	Associate's	95	16	17%	20%
	Clinical Laboratory Technologists and T	Associate's	312	86	28%	72%
	Radiologic/Nuclear Technologists & The	Associate's	321	98	31%	44%
	Diagnostic Medical Sonographers	Associate's	123	48	39%	57%
	Accountants & Tax Examiners	Bachelor's	1,294	473	37%	75%
	Operations Research Analysts	Bachelor's	45	0	0%	0%
	Biological Technicians	Bachelor's	96	988	1025%	98%
	Chemists	Bachelor's	87	129	149%	66%
	Industrial Engineers	Bachelor's	81	67	83%	113%
	Microbiologists	Bachelor's	55	136	246%	88%
	Medical and Health Services Managers	Bachelor's	795	1,025	129%	97%
	Computer Systems & Information Secu	Bachelor's	477	491	103%	114%
	Mathematicians & Statisticians	Master's/Prof	117	131	112%	121%
	Medical Scientists	PhD	115	26	23%	68%
	Computer Scientists	PhD	4	41	1025%	1104%

Lg Shortage | Shortage | In-Balance | Over-Supply | Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

Life Science & Biotech | Workforce Gap Analysis

Certificate-level positions are in-balance with local job openings. **Medical Secretaries, Medical Equipment Specialists, Medical Records** programs produce sufficient or more graduates for the Long Island economy. **Industrial Machinery Maintenance** programs appear to be unavailable.

Associate's level positions appear to be the most underserved by local programs, including **Chemical/Science Technicians** and **Equipment Technologists**. Bachelor's graduates are generally in-balance with local demand, with the exception of **Chemists**. Advanced positions such as **Medical Scientists** are slightly underserved, and **Math/Computer Scientists** are oversupplied.

More on the Methodology

"Job openings" in 2021 is used to determine demand, which is a combination of workforce turnover and retirement as well as net new jobs. Regional job openings are compared to regional graduate output using an SOC-CIP taxonomy that accounts for education levels. (For example, a Bachelor's in Psychology is not matched with a Psychologist occupation because a Master's or PhD is required.)

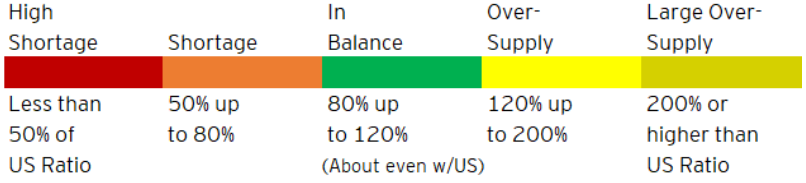
Furthermore, the "supply-demand gap" doesn't hold true as a 1:1 ratio for all occupations. Therefore, we compare the regional ratio to the US ratio to determine if regional graduate output is relatively high or low. This Regional-to-US ratio also compensates for "non-accredited" programs that may exist but aren't in the data (e.g. for-profits that aren't required to report their enrollment data to the government). For example, non-profits may train Home Health Aides which aren't in the data, but the regional comparison of "accredited" graduates to the US does help inform if a local gap may exist.

We determine the regional gap or oversupply in the right column ("ratio vs. US"). If regional graduate output is less than 50% of the US ratio, then we determine there is a large shortage and color the first "Gap" column a dark red. See the legend for colors and their ranges below.

Why does graduate output not always match job openings evenly? Graduates sometimes choose other occupations: Welding may need more graduates since many may finish the program and then choose other jobs, or an Electrical Engineering graduate with a minor in Business may choose a sales but not engineering job. Some positions, like Executive Secretaries or Logistics Clerks are helped by Certificates but many workers learn their skill on the job.

Data is sourced from US Dept. of Education's IPEDS programs (graduate output) and Lightcast/EMSI (job openings by occupation by county). We use a custom taxonomy allocates 1,000 occupation codes and 10,000 graduate program codes (CIP+AwardLevel combinations) into 310 occupation groups. Some degree programs aren't matched if they don't align with jobs in the SOC system or if more education is needed to enter the occupation.

Gap Legend and Ratio Ranges:



5 Educational programming

About this chapter

The educational programming chapter explores the overall educational attainment levels within the region, the typical entry-level educational attainment requirements by target sector, and the educational pipeline for the region. With this analysis, we seek to understand the talent supply within the region and the opportunity for employment within a target sector at various educational attainment levels. Key metrics in this chapter include:

- Educational attainment levels
- Degree production by award type
- Enrollment by level and full-time status
- Type of certificate production
- Jobs by typical entry-level educational requirement by target sector
- Apprentices

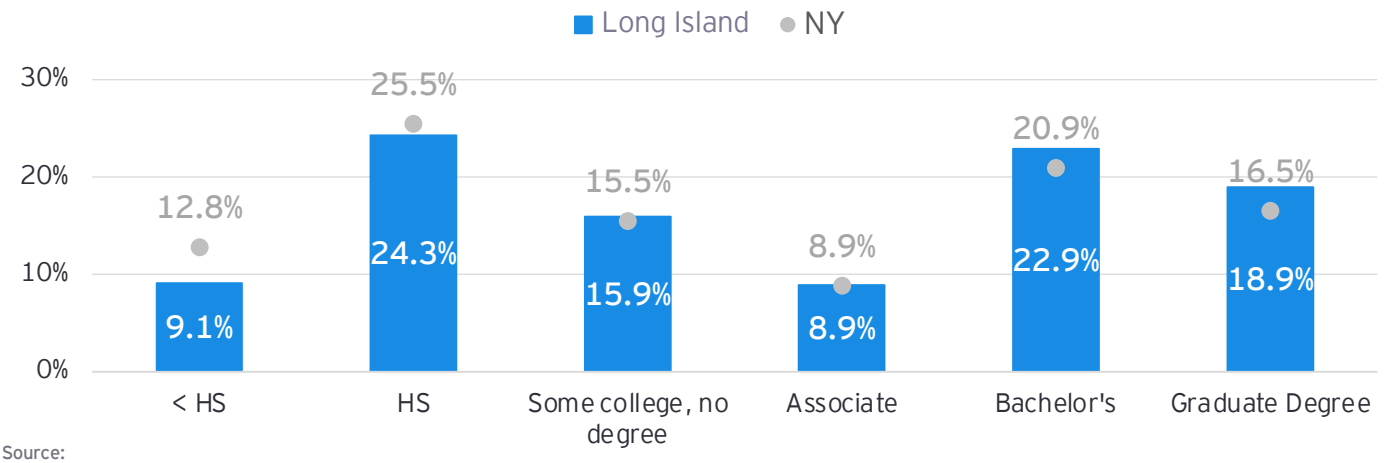
Key findings

- Long Island's adult population is well-educated and becoming more so.
- 70% of Long Island postsecondary graduates get a Bachelor's or Advanced degree.
- Health and Business programs produce the most Bachelors and Advanced degree graduates. Graduate production increased the most over the last five years in Health and Culinary.
- Apprenticeships have been growing and are highly focused on Electrician and Construction programs.

Educational Programming

The population in Long Island is well-educated, with nearly 42% of adults (25+) having a bachelor's or higher (compared to 37% for the state).

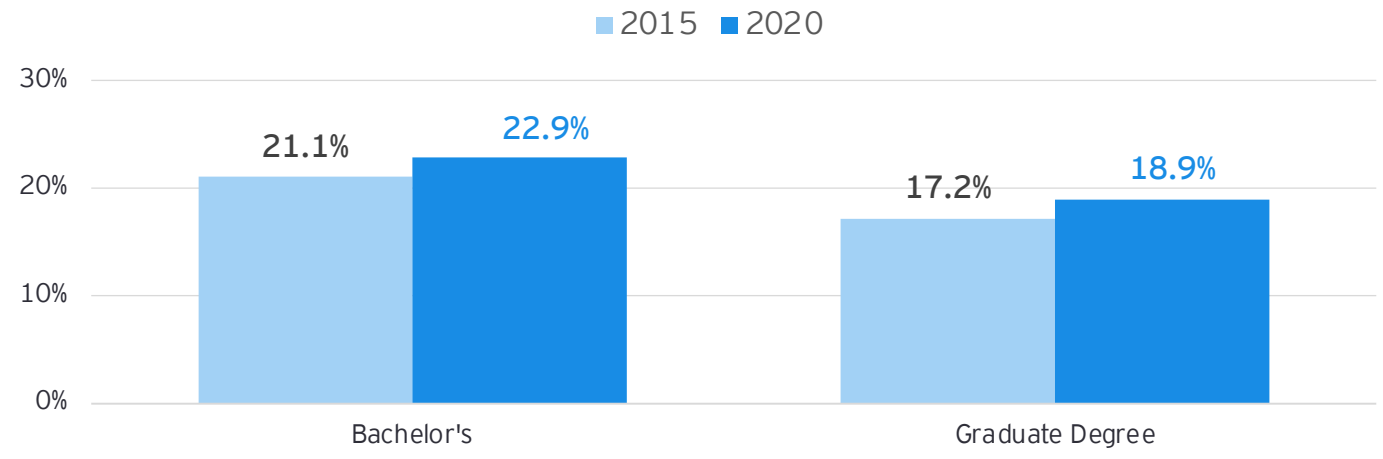
Educational attainment of population age 25 and older, 2021*



Source:
US Census Bureau

The bachelor's+ educational attainment of Long Island's adult population has improved by 4 percentage points.

Educational attainment for population age 25 and older, 2015 vs. 2021

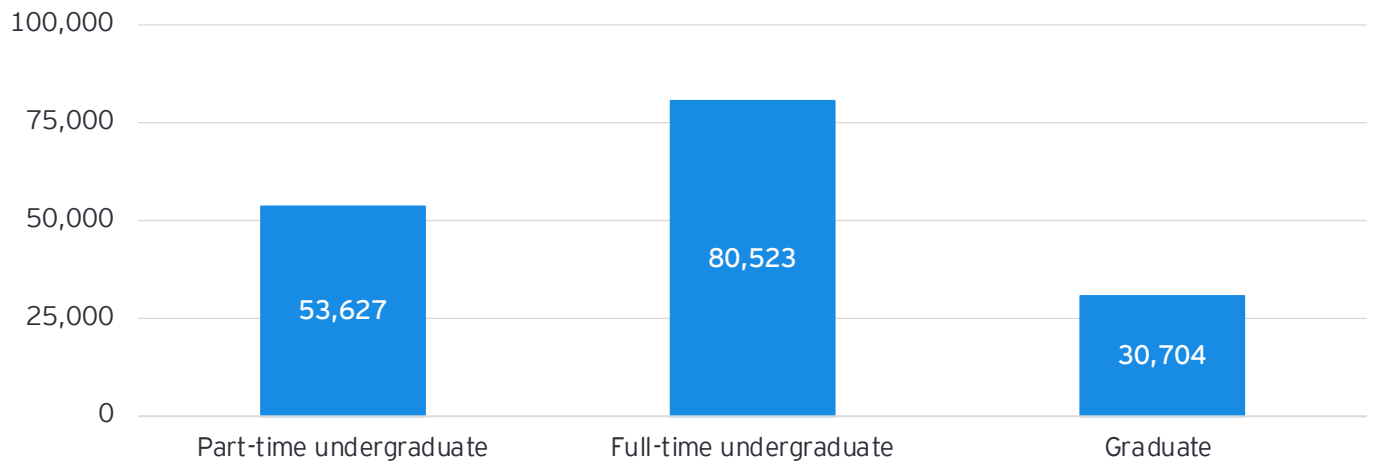


Source:
US Census Bureau

Educational Programming

Nearly 165,000 post-secondary students are enrolled in Long Island institutions. Over 70% of full-time undergraduates and graduates.

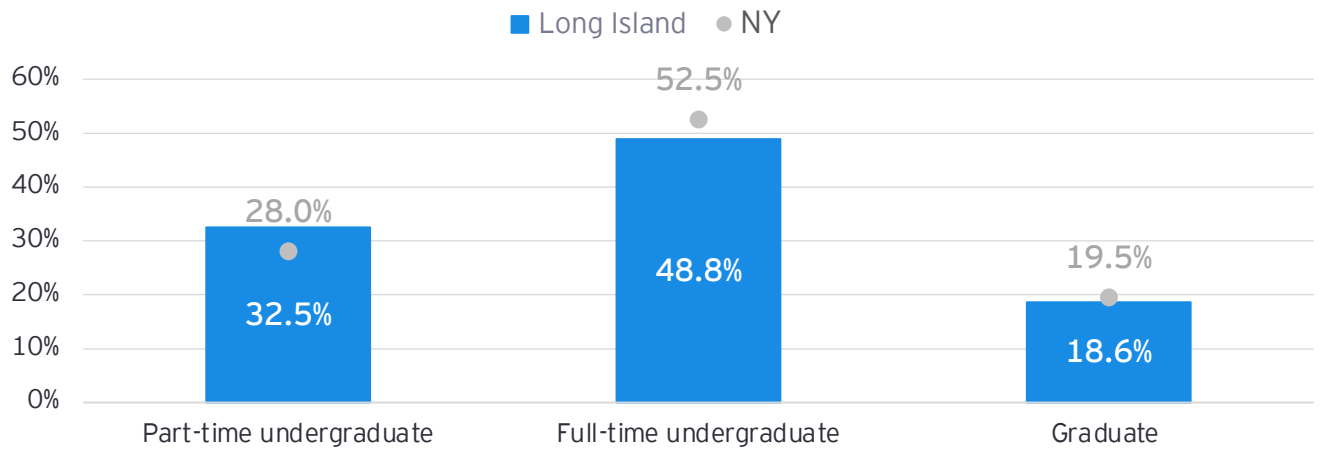
Enrollment in higher education institutions by level, 2020 – 2021 academic year



Source:
National Science Foundation, IPEDS Survey

More students in Long Island are part-time than seen across the state (5% more are part-time locally).

Share of enrollment in higher education institutions by level, 2020 – 2021 academic year

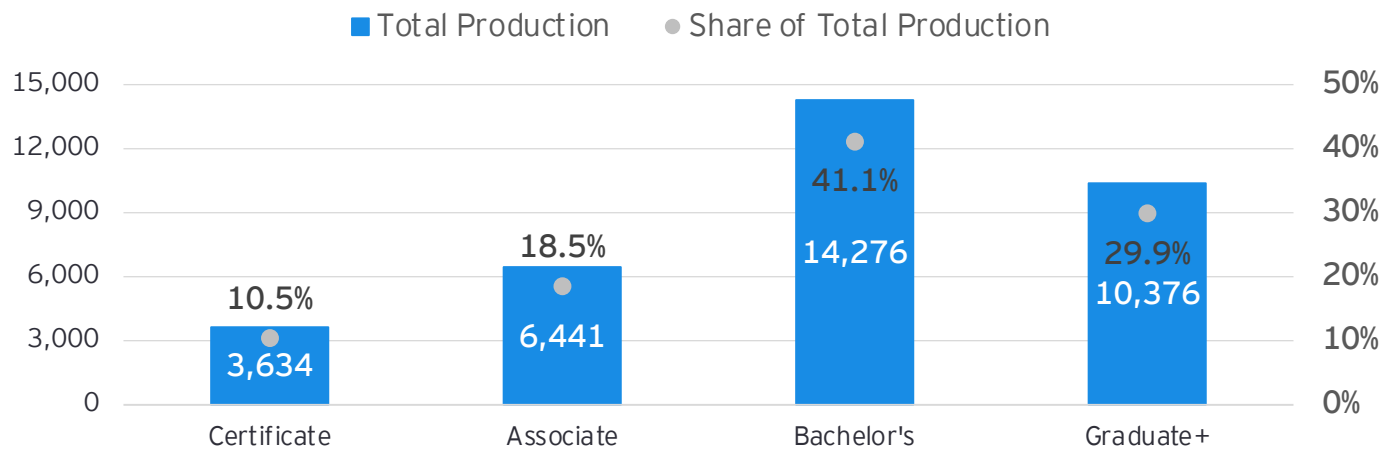


Source:
National Science Foundation, IPEDS Survey

Educational Programming

Over 70% of all accredited certificates and degrees produced in Long Island are at the bachelor's level or higher.

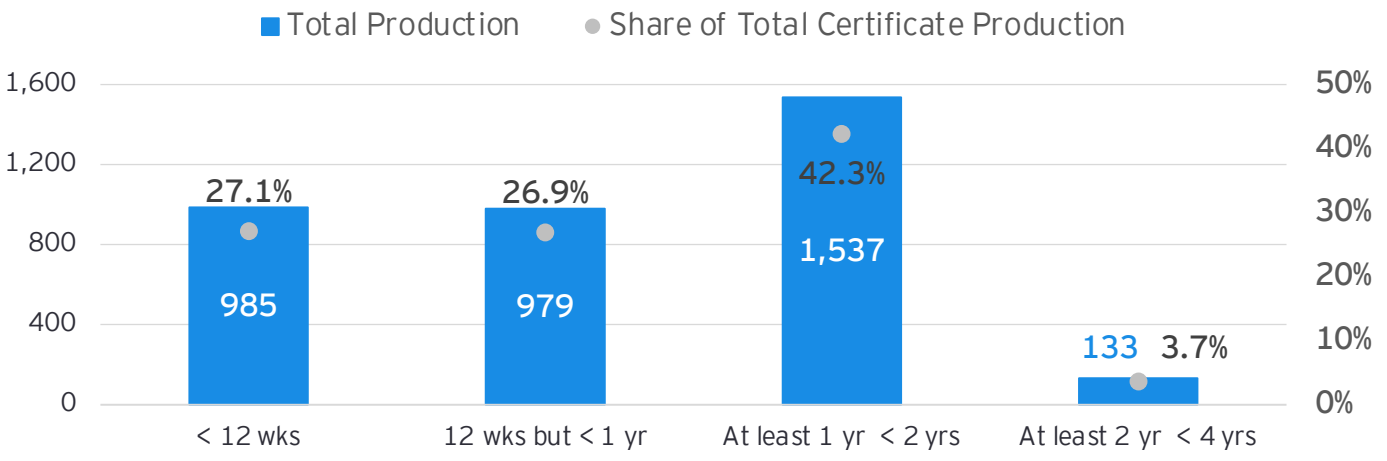
Degree production, 2020 – 2021 academic year



Source:
National Science Foundation, IPEDS Survey

Accredited certificate production in Long Island is highest for 1-year programs, but shorter-term programs account for a majority of all certificates produced.

Certificate production, 2020 – 2021 academic year

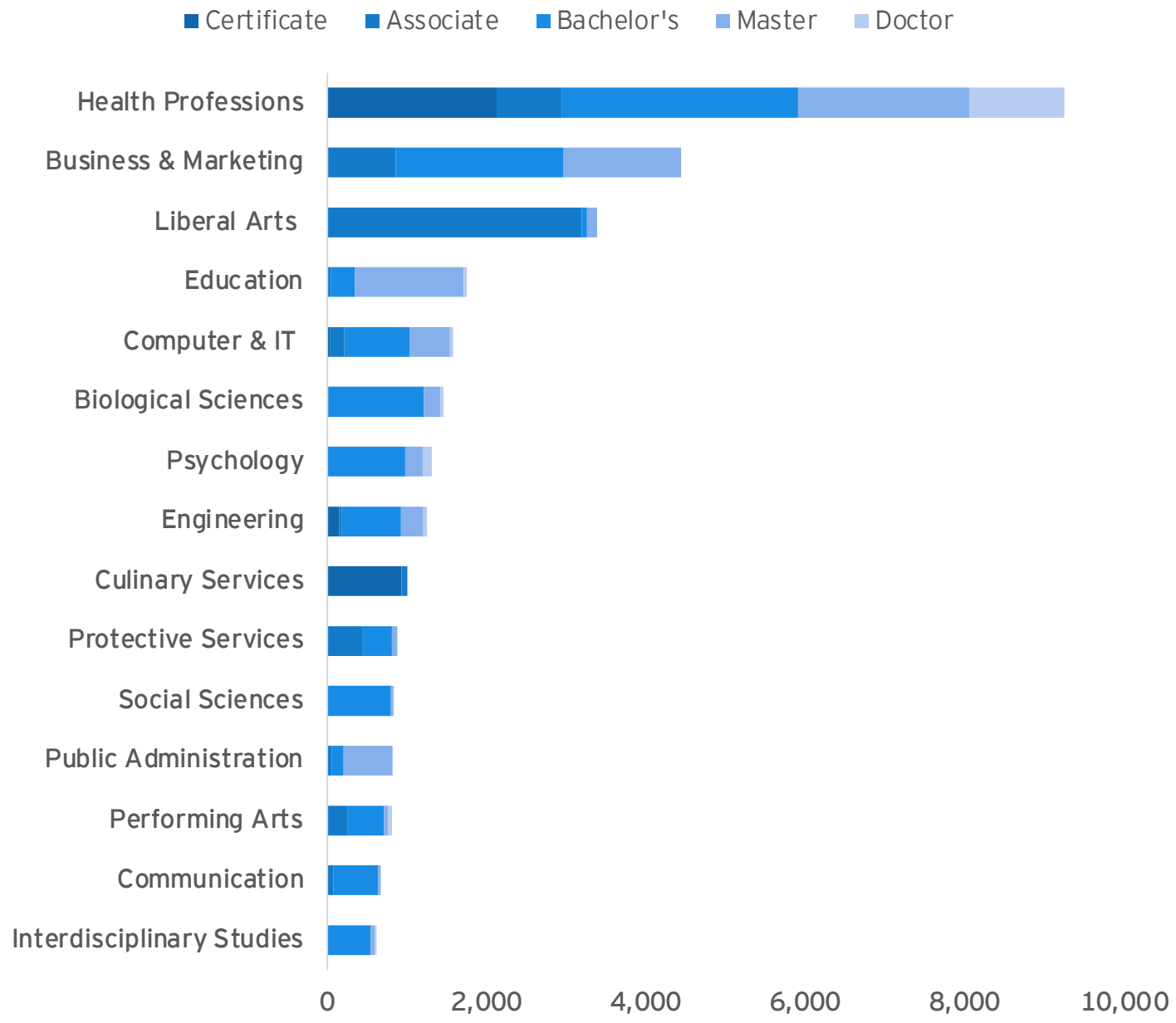


Source:
NSF HERD

Educational Programming

Health programs in Long Island produce the highest number of graduates by far, with all levels of education well-represented from Certificates to Doctorates. Business programs produce the next highest number of graduates, followed by Liberal Arts and Education. Computer/IT and Engineering reflect a relatively small share of all graduates

Top 15 degrees by award level by CIP, 2020-2021 academic year

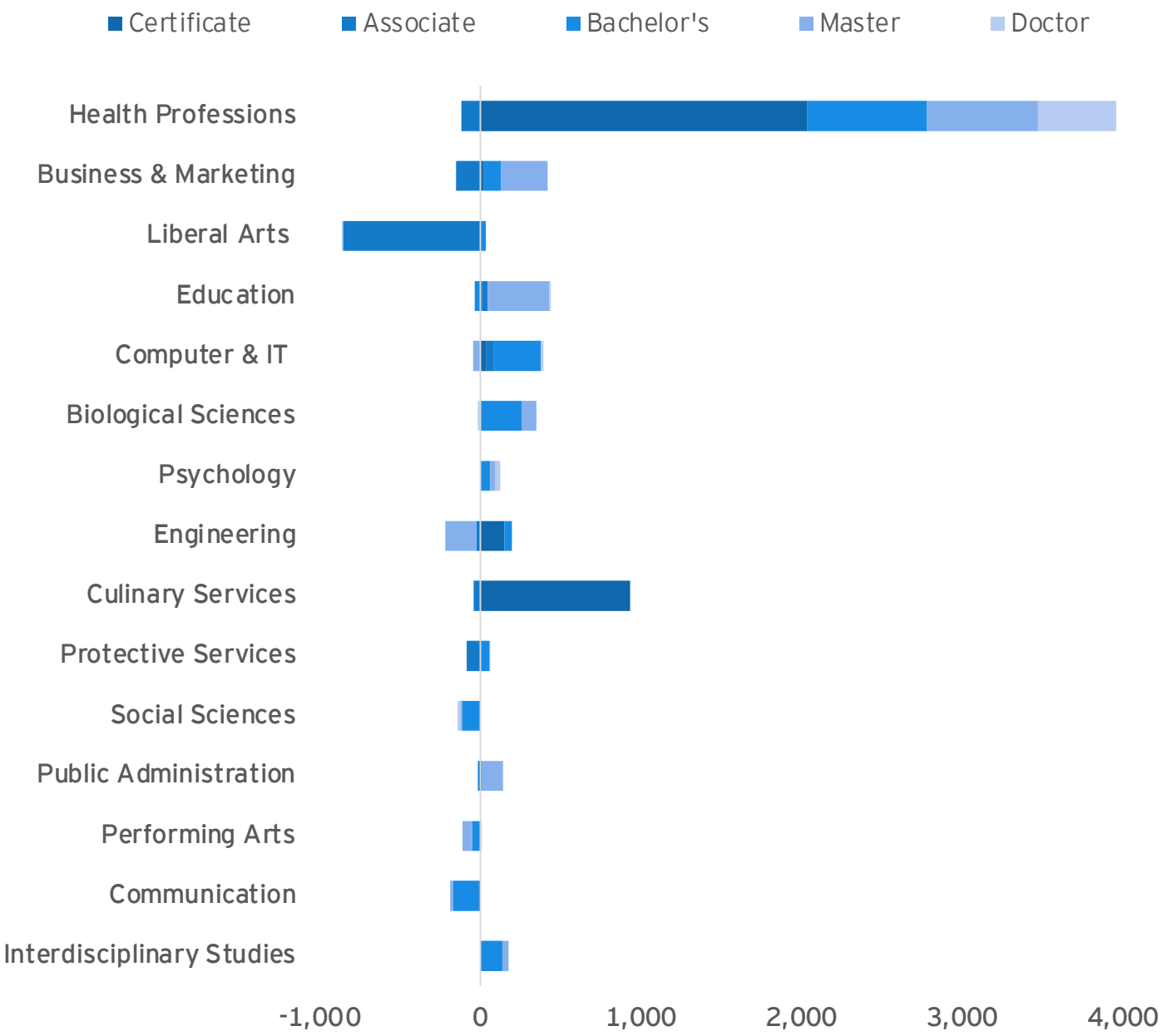


Source:
Lightcast

Educational Programming

Graduate levels increased primarily in Health Professions in Long Island. Some increase was seen in Business, Education and IT. A large increase in Culinary Certificates are provided now in the region.

Change in top 15 degrees by award level by CIP, 2015-2016 to 2020-2021 academic year

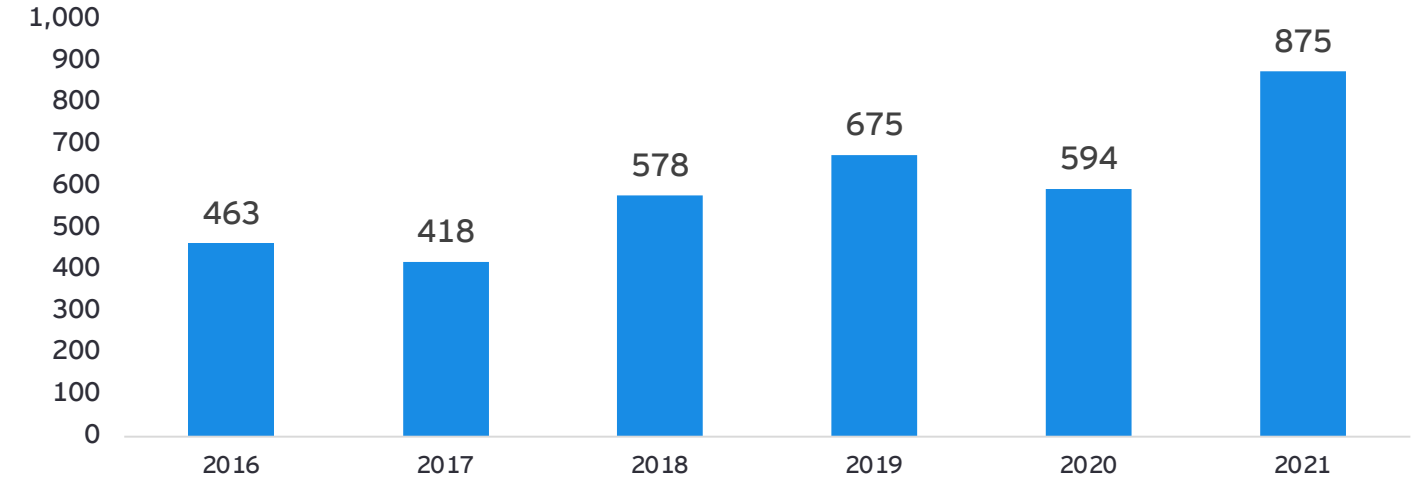


Source:
Lightcast

Educational Programming

Registered apprentices in Long Island have expanded to their highest levels since 2016, growing by more than 88%.

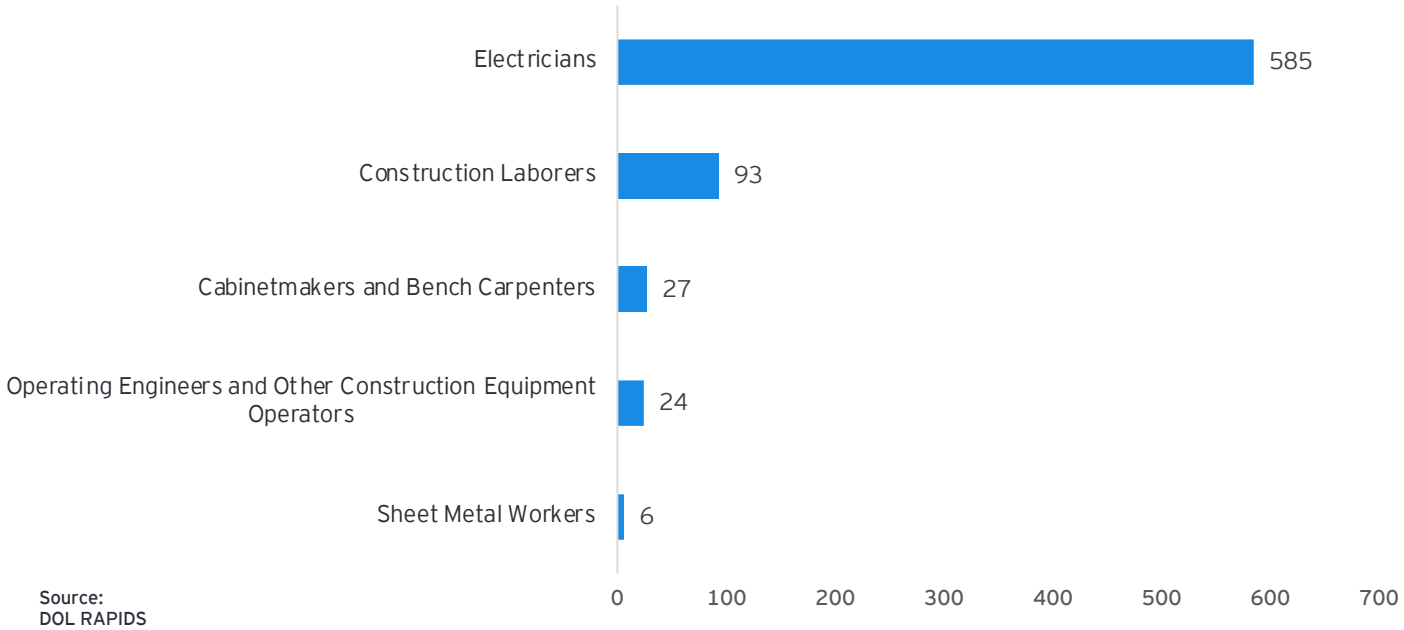
New Registered Apprentices in Long Island, 2016-2021



Source:
DOL RAPIDS

Apprentices are highly concentrated in Electrician programs, followed by Construction Laborers and Carpenters.

New Registered Apprentices by Occupation in Long Island, 2021



Source:
DOL RAPIDS

Sources

Data sources used as part of the research appendix.

Population and components of population
US Census Bureau, Population Estimates

Population by race
US Census Bureau, ACS 5-year estimates

Population by age cohort
US Census Bureau, ACS 5-year estimates

Unemployment rate
Bureau of Labor Statistics, LAUS

Labor force
US Bureau of Labor Statistics, QCEW
Bureau of Labor Statistics, LAUS

Foreign-born population
US Census Bureau, ACS 5-year estimates

Non-Citizen population
US Census Bureau, ACS 5-year estimates

Language other than English
US Census Bureau, ACS 5-year estimates

Modes of transportation and commute times
US Census Bureau, ACS 5-year estimates

Poverty rate
US Census Bureau, ACS 5-year estimates

Population with disability
US Census Bureau, ACS 5-year estimates

Civilian labor force participation rate 16+ years
US Census Bureau, ACS 5-year estimates

Unemployment rate 16+ years
US Census Bureau, ACS 5-year estimates

Labor force by age, race/ethnicity, and education
US Census Bureau, ACS 5-year estimates

Unemployment rate by age, race/ethnicity, and education
US Census Bureau, ACS 5-year estimates

Talent inflow/outflow
US Census Bureau, OnTheMap

Resident worker migration
Lightcast

Employment
US Census Bureau, ACS 5-year estimates
US Bureau of Labor Statistics, QCEW
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Top industries by employment
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Employment by industry
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Number of payrolled business locations
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Average annual earnings by industry
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Typical entry-level education by industry
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Sector employment by age and sex
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Educational attainment of residents aged 25 and older
US Census Bureau, ACS 5-year estimates

Enrollment in higher education
National Science Foundation, IPEDS Survey

Post-secondary degree production
National Science Foundation, IPEDS Survey

Degree production by award level and CIP
National Science Foundation, IPEDS Survey

Apprenticeships data
US Department of Labor, RAPIDS

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